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IMPLEMENTATION OF ISO 14001 IN MANAGEMENT SYSTEM
A case study in Greatview Aseptic Packaging Manufacturing GmbH

Master's Thesis in
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ABBREVIATIONS

CPM	Critical Path Method
CSSQ	Cost/Scope/Schedule/Quality
EA	Environmental Aspect
EMS	Environmental Management System
IMS	Integrated Management System
PERT	Program Evaluation and Review Technique
QMS	Quality Management System
RBS	Resource Breakdown Structure
SEA	Significant Environmental Aspect
SOP	Standard Operating Procedure
WBS	Work Breakdown Structure

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ABSTRACT:

With the rapid development of aseptic packaging industry, a growing number of aseptic packaging manufacturing companies require to build their Environmental Management system which is based on ISO 14001 standard in order to control their environmental affairs effectively. The purpose of this research is to find a good way to implement ISO 14001 in an aseptic packaging manufacturing enterprise. This goal is fulfilled by a case study of a German aseptic packaging manufacturing company.

The study begins with an initial environmental review which identifies the disparities between existing management system and the requirement of ISO 14001 standard. Afterwards, project management tools are exploited such as PERT & CPM in order to establish an effective project plan. Meantime, Openproj, which is a project management software, is exercised to display the scope, time, cost and quality of the project. Finally, exhaustive description concerning implementation methods is given in order to explain clear what measures should be applied and how to implement them effectively.

The research result in discussion about strength and weakness of ISO 14001 implementation in the case company as well as hindrance in project implementing process. In addition, suggestions are given in order to improve the execution efficiency in following implementation. Overall, a good way of implementing ISO 14001 in an aseptic packaging manufacturing enterprise should include top management commitment and support, Efficient and effective project management and close cooperation between departments.

KEYWORDS: ISO 14001, Environmental Management System, Project Planning, Aseptic Packaging Industry

1. INTRODUCTION

Aseptic packaging is a High-tech methods of food preservation, it refers to the packaged food, after a flash sterilization(heat until temperature between 195 and 295 °F within 1 to 2 seconds, the process will kill all bacterium in food), is packed in a sterile container under aseptic conditions. In 1961, the first aseptic filling plant was invented in Switzerland, at the beginning, aseptic packaging is normally used in packing milk. However, due to the fact that aseptic packaging have multiple advantages comparing to conventional packaging method, In recent years, the implantation of aseptic packaging is widely used in packing milk, juice, juice beverage, mineral water and wine.

The packaging material that utilized in aseptic packaging is a composite material which composed by paperboard, polyethylene and aluminium foil. Aseptic packaging technology which is adopted by a surging number of liquid food manufacturer caused the increasing consumption of aseptic packaging materials. With the rapid development of aseptic packaging material industry, an increasing number of customers begin to not only focus on safety and quality of aseptic packaging materials but also put an eye on the environmental performance of the aseptic packaging material enterprises. ISO 14001, which is the most popular environmental management system standard, is widely adopt in aseptic packaging industry to build and operate the environmental management system in order to manage and improve environment aspects.

Numerous of research regarding ISO 14001 have been completed. Cassells, Lewis & Findlater (2012) reported the success factors as well as the barriers to implementation of ISO14001 in New Zealand. Kadasah (2013) investigated the attitude of manager in Saudi Arabia regarding the influence of ISO 14001 in Saudi Arabia. Vries, Bayramoglu & Wiele (2012) addressed source implementation of the extent to which this standard has contributed to the implementation of sustainability and whether it is not only costs, but also the business advantage. Psomas, Fotopoulos and Kafetzopoulos (2011)

examined the motivation to implement the ISO 14001 standard, the difficulties and benefits gained during meeting the requirement of the standard as well as determining the most significant latent construct. However, there is little research about practice of implementing ISO 14001 in an aseptic packaging manufacturing enterprise.

In order to explain clear the implementation process as well as explore improvement measures, a research questions which is “what would be a good way of implementing ISO 14001 in an aseptic packaging manufacturing enterprise.” is indicated in this thesis. This research question will be operationalized with the following questions:

1. What are the disparities between current management system and ISO 14001 standard?
2. What is the project plan of ISO14001 implementation?
3. What are the impediments in ISO 14001 implementation and how to overcome them in the future?

The author of the thesis participated a project which named “the implementation of ISO 14001 in management system” in Greatview Aseptic Packaging manufacturing GmbH (further referred to as “Greatview GmbH”) which is one of the worldwide leading suppliers of aseptic beverage packages. The project aims to integrate the Environment management system which according to the ISO 14001 standard with existing ISO9001 and BRC/Iop based management system and complete a comprehensive management system. Due to the limited internship period (3 months), the whole project is divided into two parts, Part one-“Preparation and Plan” and Part two- “Practice”. The author is responsible for part one. The main task includes: complete the project plan, identify Environmental Aspect & Significant Environmental Aspect and establish the further implementation process, part two is left for another intern who will begin his work three months later.

The goals of this thesis are: to design a project plan for implementing ISO 14001 in management system of the case company, to set up a realistic process for the ISO14001 implementation and to give improvement suggestions for further ISO 14001 implementation.

The remainder of this thesis can be divided into four parts. At first, the author describes briefly research material and methodology. Secondly, literature review and background information are presented to clarify used theory and tools. The third, basic information about the case company and an initial review of the current management system in the case company are given. Subsequently, description and analysis about project flow are provided. Finally, the result of the thesis is summarized and discussed, followed with research limitation and further research questions.

2. RESEARCH MATERIAL AND METHODOLOGY

Literature review and case study are exploited as main research methods in the study. The main body of literatures in this thesis includes: quality management system, BRC/IOP standards, environmental management system, integrated management system as well as project management, the review provide the basic information about two ISO standards, why integrate ISO 14000 standards into existing management system which is based on ISO 9000 standard and the main difficult in integration. Moreover, the review describes the concept and process of project management. Finally, an introduction about project management software is given. Most literatures collected from e-resources through internet, some paper resources collected from the library of Martin-Luther-University, Germany and University of Vaasa, Finland.

Case study is the second research method in the thesis. The case study in Greatview GmbH concentrate on effectively implement ISO 14001 in existing management. The case study involves participation observation during a period of employment in Greatview GmbH, a content analysis of existing state of management system in Greatview GmbH and interviews with employees in Greatview GmbH. Specifically, participation observation is utilized to record the feedback and hindrance in implementation phase. The purpose of Interviews to employee is to verify and supplement the observed and document findings. Since the author is responsible for preparation of the project as well as project plan, all main documents are created by the author with cooperation with the project leader and the supervisor.

3. LITERATURE AND BACKGROUND INFORMATION

3.1. Management system

3.1.1. Background information

“A management system is a proven set of framework that an organization uses for managing and continually improving its policies, programs and processes and achieving its objectives” (Bishal 2010). According to ISO (2014a), management system introduced a procedure which organization needs to meet in order to fulfill customer demand for quality, regulatory compliance or to meet environmental targets.

the purpose of an Effective implementation of management systems is to help manage the social, environmental and financial risks, improve operational excellence, reduce costs, improve customer satisfaction, eliminate trade barriers, promote innovation to ensure continuous improvement, protect brand integrity and clarity in the market. The new concepts of management by the institutions is guided by increasing global competition and rapidly changing industry environment. (Badreddine, Romdhane & Amor 2009).

3.1.2. ISO 9000 standards

ISO9000 series of standards means that the most popular and widely used standards which represent all international standards of quality management system, issued by ISO in 1987. The aim is to help companies fulfill their customer and stakeholder needs (Zuckerman 1997).

According to ISO (2014b), “Standards in the ISO 9000 family include: ISO 9001:2008, ISO 9000:2005, ISO 9004:2009 and ISO 19011:2011. ISO 9001:2008 clarify the

requirements of quality management system. ISO 9000:2005 describe the basic concepts and language, ISO 9004:2009 is the guideline for making a quality management system more efficient and effective and ISO 19011:2011 display guidance on internal and external audits of quality management systems.”

In ISO 9000 standards family, ISO 9001 is the only standard which can be certificated. The latest version is ISO 9001:2008; the revisions to ISO 9001:2008 were conducted in order to be compatible with other ISO standards, especially ISO14001 environmental management system. The final updated version is expected by the end of 2015 (ISO 2004b).

ISO 9001:2008 express the basic requirements of a quality management system (QMS) which an organization must fulfill to explain its ability to consistently provide products and/or services to improve customer satisfaction, and to comply with the basic requirements of applicable laws and regulatory requirements of capabilities.

The quality management system standards based in ISO 9000 family of standards have eight principles which are:

Principle 1 – Customer focus: organizations need to understand both current and future customer requirement, have to fulfill customer needs and try to surpass customer expectations.

Principle 2 – Leadership: the purpose and direction of the organization are determined by the leadership. They need to establish and keep the internal environment in which people can participate fully in achieving the organization's goals.

Principle 3 – Involvement of people: an organizational talent needed to be active and full participation of all levels of ability to make the interests of the organization.

Principle 4 – Process approach: a required result is realized more efficiently as long as activities and related resources are controlled as a procedure.

Principle 5 – System approach to management: determining, understanding and controlling related procedures as a system to help companies effectively achieve its goals.

Principle 6 – Continual improvement: a perpetual goal of the organization is continual improvement of the organization's overall performance.

Principle 7 – Fact-based decision: Effective decisions are in view of data and information analysis.

Principle 8 – Mutually beneficial supplier relationships: within an interdependent relationship, the mutually beneficial relationship improves the capacity of both organization and its suppliers to create value (ISO 2014c).

The eight principles provide a general perspective on the quality management system based on ISO 9000 series. There are many different ways of applying these quality management principles. It is determined by the organization's nature and the specific challenges it faces (ISO 2014c).

Implementation of quality management system which based on ISO 9001:2008 standards can bring following benefits to organizations:

- Provide job performance consistency
- Allow to discover the reason for poor performances
- Contribute to the goals and objectives identified
- Emphasize the process approach
- Provides benchmarks to measure improvements
- Win customer trust

- Maintain a clear responsibility and authority
- Maintain stable quality
- Helps in international trade
- Helps to improve cycle time and efficiency (Bishal 2010; ISO2014c).

3.1.3. BRC/IOP Global standard for packaging and packaging materials

The standard developed by the BRC (British Retail Consortium) and IOP (Packaging Association) help retailers and food manufactures to fulfill their legal obligations. It is now widely regarded as a prerequisite for the supply of food packaging in major UK retailer and provide the common ground of company's audit.

According to British Retail Consortium (2011:3), the fourth issue of the Global Standard for Packaging & Packaging Materials aims to provide a common basis for enterprises with its own brand food packaging manufacture's certification in order to protect consumers. The standard specifies the safety, quality and operational standards required to fulfill the relevant legal compliance and consumer protection obligations range of packaging manufactures.

The BRC/IOP Global Standard for Packaging is designed to help packaging manufactures and converters using good manufacturing practices and supporting the quality management system in order to develop and produce safe, legal packaging materials which fulfill the quality requirement of its customers. According to British Retail Consortium (2011:4), "The Standard is based on the following key components: senior management commitment; risk assessment of the product and manufacturing process; and a systematic approach to managing product quality and safety".

There are many benefits generated by the adoption of the Standard. They include:

- Provide a single audit report which admitted by many related parties - save time and costs.
- Operating within qualifications framework that confirm the results of certification have global reliability and acceptability.
- A comprehensive range covers the quality, hygiene and product safety assessment and approval of suppliers to meet the needs of most customers in the field.
- A framework is offered for quality and hygiene management systems in companies that promote continued improvement, waste reducing and efficiency growth.
- Publishing the judicial demand of the packaging manufacturer/supplier, packer/filler and retailer. Packaging manufacturers could also use this Standard to assure their suppliers comply with excellent manufacturing practices and are fulfilling legal requirements.
- Certificated sites applied the marketing opportunities, by identification on the public BRC Global Standards Directory website and use of the BRC logo (British Retail Consortium 2011:4).

3.2. Environment management system

3.2.1. Background information

An Environment management system (EMS) is a comprehensive and systematic system which is used for achieving its environmental goals through reducing resource consuming, prevent pollution and boost the operating efficiency. According to Steven, Robert & Roger (2003), an EMS is a management tool which helps firms in processing the environmental impacts for which they are considered to be responsible. It provides appropriate procedures for the efficient training of personnel and report information

concerning corporate environmental performance to both internal and external stakeholders.

An EMS should continue to provide the exact understanding of impacts to an organization. Their activities which affect the environment as well as the potential impact. Environmental managers must use this information to ensure that unfavorable impacts are minimized. Besides, internal environmental policies and external regulatory requirements are met, and to ensure that the roles and responsibilities of relevant employee have been assigned and communicated effectively. A key factor of EMS is the management require to illustrate a commitment to continuous improvement through regular audits, reviewing and reviewing its EMS requirements (Hagarty 1999:17-18).

An EMS is pivotal to an organization's ability to predict and fulfill growing environmental performance expectations and to confirm ongoing compliance with national and international requirement (Gregory 2000:1).

Generally, an EMS should include following basic elements:

- An appropriate environmental policy should be built, including management commitment to the prevention of pollution;
- Determine the legal requirements and environmental factor of organizations' relevant products and services;
- Develop management and employee commitment of environmental protection. And clearly assigned accountability and responsibility;
- Stimulate environmental planning across the full range of organization's activities;
- Establish a strict management process to achieve the targeted levels of performance;
- Provide appropriate and sufficient resources to achieve targeted based on the existing level of performance;

- An emergency preparedness and response procedures should be established and maintained;
- Built an operational control system and maintain the procedure to confirm continuing high levels of system performance;
- Seek improvement through assessing environmental performance according to the policy and applicable goals and objectives;
- Establish and maintain communications with internal and external stakeholders;
- Encourage contractors and suppliers to establish their own EMS (Gregory 2000: 1-2).

An EMS can also help solve the problem of non-regulated issues, such as energy conservation, and promote greater operational control and staff management. The EMS itself does not indicate what environmental performance that must be realized; each company's EMS is tailored to its own business and goals (Gregory 2000: 3).

The benefits of EMS include:

- Enhance corporate image with public, regulators, lenders, investors;
- Attract new customers and markets (or at least preserve access to customers and markets with EMS requirements);
- Improving the environmental performance of products, promote technological progress in enterprises;
- Saving energy, reduce cost and enhance the market competitiveness of enterprises;
- Improve enterprise management level, to promote enterprise management from extensive to intensive management;
- Reduce/mitigate risks;
- Increase employee morale (including the possibility of enhanced recruitment of new employees) (Donald 1996:24-26; Robert 2003).

3.2.2. ISO 14000 family standards

With increasing concern for maintaining and improving quality of the environment and protecting human health, the environmental performance of an organization is more and more important for internal and external interested parties. Numerous different standards concerning environmental management are applied before an international standard was published to fulfill this requirement. The best known two were the British Standard BS7750:1992 which is the first EMS standards and the European Union's own regional Eco-Management and Audit Scheme (EMAS) which is arguably the best model from an environmental perspective due to its reporting requirements (Bisson 1995:149; Gleckman 1996).

The International Organization for Standardization (ISO) recognized the need for an international standard for environmental management. In 1991, the strategic Advisory Group on Environment (SAGE) was established by the ISO to give recommendations which related to international standards for the environment (Gregory 2000:3). "In the same way as the international quality standard ISO 9000 was based on BS 5750, ISO 14001 grew out of BS 7750. It was published in 1996, leading to the withdrawal of BS 7750" (Edwards 2004:8). The purpose of those standards was to ensure that the organization is secure for the employees, the customers and the environment. Technical Committee (TC) 207, the specialized committee within ISO organization, issued subsequent versions; in 2004, the latest version of the standard has been in place worldwide as a third-party evaluation criteria (Nasser 2013).

The ISO 14000 family contends with a variety of aspects of environmental management. It provides utility for companies and organizations to identify and control their environmental impact and continuously improve their environmental performance. According to ISO (2014d), the ISO 14000 family includes "ISO 14001:2004 and ISO 14004:2004 concentrate on environmental management systems. The other standards in the family focus on specific environmental aspects such as life cycle analysis, communication and auditing".

3.2.3. ISO 14001:2004 standard

ISO 14001:2004 presents the criteria for an environmental management system which can be certified. It does not express environmental performance requirement, however, it lay down a framework that a company or organization can follow to establish an effective environmental management system. It can be utilized by any organization regardless of its activity or sector. Implementation of ISO 14001:2004 can provide promise to company management and employees as well as external stakeholders that environmental impact is being measured and improved(DIN 2009:5-7).

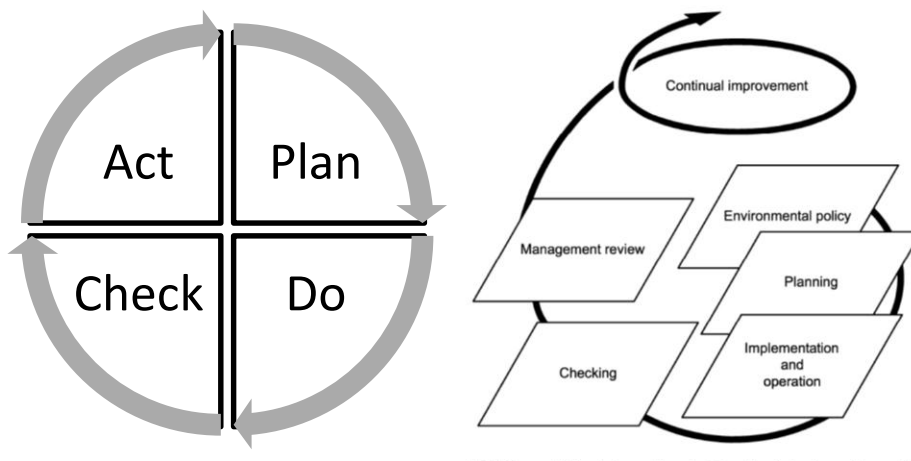


Figure 1. PDCA cycle and the approach in ISO 14001 standard (DIN 2009:7)

ISO 14001:2004 is based on the same methodology as ISO 9000, which is Plan-Do-Check-Act (PDCA) cycle. It is also known as Deming cycle/wheel., PDCA can be briefly described as follows:

- Plan: build the objectives and processes in order to achieve results which based on the organization's environmental policy.
- Do: execute the procedures.

- Check: observe and evaluate procedures which opposed to environmental policy, objectives, targets, legal and other requirements, and announce the result.
- Act: take actions to continuously improve performance of the environmental management system (DIN 2009:7).

The benefits of using ISO 14001:2004 can include:

- Waste management costs are significantly reduced
- Consumption savings in energy and raw materials
- Reduce distribution costs
- Strengthen corporate image among regulators, customers and the public (Hillary 2004; Henk, Deniz & Ton 2012).

The principle of ISO 14001

In ISO 14001, the Deming cycle is explained as planning, implementation and operation, checking and management review. PDCA cycle is defined as an ongoing and repeated process which improves environment performance continually.

Moreover, ISO 14001 set environmental policy as an important step. Environmental policy constitutes an organization's action principles. It establishes the environmental responsibility and performance which are required by organization (Rema, Juli & Benno 2012). The basic requirements of environmental policy are: to reflect the top management's commitment, to comply with applicable legal requirements, to prevent pollution and continually improvement. It is highly recommended to integrate environmental policy with organization's quality policy/ safety policy since it is easier for internal and external interested parties to understood and communicated (Edward 2004:24-25).

In planning phase, the most important step is to identify the Environmental Aspects (EAs) as well as evaluate the Significant Environmental Aspects (SEAs). The elements of activities, products and services in an organization which can interact with the environment are environmental aspects (DIN 2009:26). Organization should not only register the environmental aspects which it can control but also it can influence (DIN 2009:27). such as selection of purchasing component and their suppliers. Because an organization normally have numerous environmental aspects, a systemic criteria and method should be established to determine which of them have significant impact. Those EAs with severe environment impact called SEAs. ISO 14001 encourage organization to set its own criteria to determine SEAs because there is no single approach which is suit for all organizations (Veldt 1997).Determining SEAs is the most important result in plan phase, because the primary objective of next implementation steps such as objectives and targets, training, communications, operational controls and monitoring programs is to control the SEAs.

ISO 14001 require organization to identify and have access to the legal and other requirements that are applicable to the environmental aseptic of its activities, products and services. The purpose of this procedure is to make sure the organization to recognize the various requirements and decide how they pertain to the environmental aspects of the organization. It is helpful for an organization to retain an up-to-date register or list of applicable legal requirement to facilitate the tracking of legal requirement. This legal requirement list can be very different between two facilities. Even the same company, however they operated in two different countries/states, may have quite different legal requirement register because of the local laws and regulation's difference (Edwards 2004: 27-28; Hillary 2000:151-154).

In plan phase, organization need to set objectives and targets to fulfill the commitments established in environmental policy and achieve other organizational goals. Legal requirement and SEAs are two main elements which an organization need to consider in

defining objectives and targets. Besides, technological options, financial, operational and business requirements and the views of interested parties are other components which should be considered (Kausek 2007:60-63).

All steps in plan phase are the common steps which all organization need to apply, however, after plan phase, steps may be various between different organizations since they have a different defect in environment performance and different SEAs.

The organization need to execute methods to control environmental impacts in implementation and operation phase of ISO 14001. More specific, organization can choose the most effective method they think to control environmental impact. For instance, modify working instruction; implement the best available techniques, emergency preparation and response, etc. In the meantime, some supporting processes should also be applied to assist the implementation and operation. For example, environmental communication method, relevant technique or awareness training and document control process are useful (Edwards 2004:31).

Assessment, monitoring and evaluation of an organization's environmental performance are included in checking phase. Check phase is a process for identifying nonconformity in EMS and taking corrective or preventive action to help an organization operate and maintain EMS as it plans. Keep and manage environment records give reliable sources on the operation and results of its EMS and periodic audits help organization confirm the system is designed and operated well according to the initial plan (Edwards 2004:37-40 Cory, Oguz & Stanislav 2012).

The last phase of the ISO 14001 is management review. ISO 14001 require the top management organize a review of its EMS to evaluate the system's continuing acceptability, effectiveness and suitability. The management review should include all

EAs within the scope of the EMS. The record of EMS management review can be retained in organization annual report (Edwards 2004:40).

3.3. Integrated Management System

3.3.1. Why integrate QMS and EMS

As the economies continue to merge on a global scale, fragmented systems may create barriers for a company trying to access new markets or even maintain current markets in the long run. For instance, a product manufactured in one country may be rejected in another country because of quality and/or environmental “deficiencies” When management systems are various, it becomes very difficult to manage them which may lead to inefficiency and substandard product (William 1998:39).

Thus, building an integrated management system become necessary for most international enterprises. The concept of an integrated Quality and Environmental Management (QEM) system is a comprehensive, single system where quality and environmental issues are taken into account at the same time, and where QMS and EMS lose their independence (Karapetrovic & Willborn, 1998).

The purpose of an integrated management system is to help provide all the functions of each part of the respective management system, in order to display how they affect and complement one other, and to indicate how their relationship help to manage the organization’s representative management systems risks (Wayne & Terri 2010:4-6).

The reasons to adopt QMS and EMS can be internal or external. With the internal reasons, cost and defect reduction, efficiency improvement, and environmental/ quality improvement are the most important issues. External reasons are generated by the requirements of customers and other external stakeholders. Such as an interest in

improving the corporate image, gaining marketing advantage, fulfillment of the customers and other stakeholders' requirement and the possibility of entering new markets (Juan & Jos é2010).

3.3.2. Benefits of IMS

As for the benefits, QMS and EMS can use two complementary ways to produce them. They can generate internal benefits through reform of company processes and external benefits in the market. Internal benefits involve the internal functioning of the company. Such as:

- Productivity increased
- Cost and waste reduced
- Procedures improved
- Employee moral enhanced (Juan et al. 2010).

External benefits emerge from the effects of quality and environmental aspects of the satisfaction of customers and other stakeholders that may lead to:

- Sales and market share increased
- Customer relationships enhanced
- Customer satisfaction levels improved
- Company image improved (Juan et al. 2010).

Furthermore, an integrated system brings numerous benefits to different system such as:

- Improvements in the efficiency and effectiveness of the organization, to avoid the reproduction of work
- A decline in bureaucracy to remove policies, procedures and registration
- Target, processes and resources orientation
- A more integrate and global view of the organization lead to a better management decisions, the version of the organization is also developed/enhanced
- A reduced workload for system implementation and maintenance is obtained from simplification of documentation, paperwork and audits;

- Higher staff motivation and reduction of internal inter-functional conflicts are derived from greater acceptance by employees;
- Removing traditional management systems boundaries and barriers result in the availability of joint training and more effective internal communication,;
- Enhancing confidence of customers and positive corporate image through improving delivery of products and services to the customer; and
- Heighten employees' reaction to change (revise processes, evaluate results . . .) (Juan et al. 2010, Palmira 2010).

Another Reserch shows that implementing and integrating QMS and EMS can have a significant impact on the financial success of a business. Moreover, an integrated management system may bring multiple benefits to company such as: potential increase when assessing in new market, cost reducing, accessibility and faster time to market with a competitive advantage, an abatement in the costs on components and materials obtainment and a decline in administrative and material cost (William 1998: 43, Schaltegger, Stefan&Petersen 2003:302-303).

3.3.3. Difficulties in implementation of IMS

It is vital that companies understand the barriers, associated challenges and obstacles that accompany the integrated systems:

- Different perception of customers and stakeholders;
- Interests of product quality improvement are less homogeneous internally and externally than Interests relating to the environment;
- Obtaining the relevant expertise to cover all system requirements is hard to achieve
- Multiple interests and motivations could result in Inter functional conflict;
- Only concentrate on integration of documentation and records which is caused by misunderstand of integration;
- Some hindrance may be faced from people who lose "ownership" of forms or

procedures;

- A lack of strategic planning and communication between top/middle management and employees on aspects of the integration process may result in a failed integration.
- Poverty of sufficient organizational culture
- Different opinions in the scope of the integrated project; and
- Constantly change of regulations, and guidelines (Juan et al. 2010, Palmira 2010).

Consequently, the difficulties, or the concerns registered in the process of integration of systems in the organizations are related mainly to the initial communication between the involved parts. The too much joined difficulties that arise are related to the interferences in the attendance to the external public, to the paradigm that a system is more important than another, possible misunderstanding concerning integrate contents and methods and the cooperation between the involved areas (Assed, Cl áudia & Daniel 2007).

3.4. Project management

3.4.1. Introduction to project management

A project is to create a unique product or service that obtain beneficial change or added value through a temporary and one-time attempt. The regulation of organizing and managing resources in such a way that people utilize these resources in order to complete a project within defined scope, time and cost restriction is known as project management(Patel 2008:1).

A complete project management may consist of number of different types of activities such as:

- “Planning the work or objectives

- Analysis and design of objectives
- Assessing and controlling risk (or risk management)
- Estimating resources
- Allocation of resources
- Organizing the work
- Acquiring human and material resources
- Assigning tasks
- Directing activities
- Controlling project execution
- Tracking and reporting progress
- Analyzing the results based on the facts achieved
- Defining the products of the project
- Forecasting future trends in the project
- Quality management
- Issues management
- Defect prevention
- Project closure meet” (Patel 2008:7).

According to Patel (2008:7-9), through solid estimation and response planning techniques, project management tries to gain control over the following variables:

- “Time
- Cost
- Scope
- Risk” (Patel 2008:7-9).

And six other areas

- “Integration

- Communication
- Human resources
- Quality assurance
- Schedule development, and
- Procurement” (Patel 2008:7-9).

3.4.2. Project Planning

Project planning define the accurate parameters of a project and confirms that all the pre-requisites for project execution and control are in place (Patel 2008:75). According to Richman (2002: 49-50), planning and control could not be separated. A project manager can perform proper control with a solid plan. Without a plan, project control is impossible as well as nothing could compare progress against.

Work breakdown structure

“A work breakdown structure (WBS) is a tool used to graphically display the deliverables of the project in a hierarchical fashion. It organizes the work of the project into logical groupings and displays the information in a tree from or an outline form” (Heldman 2011:106).

Identifying risks

A risk refer to the possibility of a problem which may occur on the project, thereby menacing the project’s outcome in some way. Risk management is a multi-step process. First is the risk identification, then to analyze the risks and define the impact of the risk. Afterwards to calculate the probability of the risk occurring. Finally to decide which of the identified risks need a risk response plan through combining the impact analysis with the probability analysis. Risk management can conduct during the entire process of a project (Heldman 2011:144-145).

Cost considerations

Costs include the people, materials and equipment which are required to complete the project. The client normally wants the cost of project be as low as possible. Generally speaking, the scope and schedule of a project determine its budget (Richman 2002:65).

Scope considerations

The project scope is a balance between the time, budget and resources available. A good scope statement clarify the outcome of the project. It describes what will and will not be accomplished at the end of the project (Richman 2002:66-67).

A project is an independent organized task that should have an explicit target, schedule (from beginning to the end), budget, scope, resource consumption and constraints.

Communication

Communication is a key, communication within a project not only includes talking to stakeholders, team members, customers, vendors, senior management, and so on. But also creating status reports, generate project documents by the truckload, generate reports, write email, and more. A good communication helps everyone know exactly their roles and responsibilities, and everyone will understand what status of the project is at any time and what's still to come (Heldman 2011:33).

Time estimation

Accurate time estimation is a skill indispensable for good project management. It is important to have time estimates right for two main reasons:

- Time estimates set up deadlines for conveyance and preparation of projects, and hence will effect on other people's evaluation of project manager's reliability and ability.
- Time estimates often define the valuation of contracts and hence impact the profitability of the contract/project in commercial terms (Heldman 2011:168-169).

As an essential input, time estimates and other techniques organize and structure hand by hand within all projects. a good time estimation techniques may break down large projects into a series of smaller projects (Liz 2008).

3.4.3. Project execute and control

“The purpose of project execution and control is to develop the product or service that the project was commissioned to deliver. Project execution and control utilizes all the plans, schedules, procedures and templates that were prepared and anticipated during prior phases” (Patel 2008:155).

According to Patel (2008:156-157), five processes are included in this phase, they are:

- Conducting project execution and control kick-off,
- Managing cost/scope/schedule/quality(CSSQ),
- Monitoring and control risks,
- Managing project execution,
- Gaining project acceptance,

3.5. Applied project management tool-openproj

3.5.1. Introduction to OpenProj

OpenProject is a desktop project management software, it can create a new project for the project manager to build, manage and monitor the operation of each task. As same as Microsoft Project, OpenProject can schedule tasks and its dependencies through drag control. It also offers a variety of charts to present one project in many different ways, such as Gantt charts, Network Diagram (PERT Charts), WBS diagram, RBS map and so on. Because OpenProj is written by the Java language, it can not only run on Windows, but also can be implemented in Macintosh and Linux operating system (Heck 2007).

The reason why the author chose OpenProj as applied project management software are various. At first, because it is available for free. Secondly, the look and feel of the software is very close to the most popular software Microsoft Project. At last, any task created by OpenProj can be used in MS Project when it becomes necessary and vice versa.

In the thesis, OpenProj is used to build a Gantt chart and PERT (Program evaluation and review technique) chart then using CPM to identify the critical path of this project. The manager can easily recognize the project structures, the critical tasks, as well as the most probable time to complete the project.

3.5.2. Gantt chart

Gantt chart is a bar chart, developed by Henry Gantt in the 1910s, to demonstrate a project schedule. In Gantt Chart, the time taken by an activity is represented by a horizontal bar, the length of which being proportional to the duration of activity. (Kanti 2006:11) "On the left of the chart is a list of activities and along the tops is a fitting time scale. As a rule, the time in the chart should flow from left to right and the activities are listed from top to bottom" (Kanti 2006:11). Gantt chart not only denotes the schedule of project, but also be regard as a good technique of reporting the actual progress and comparison with the

schedule. Because Gantt charts can display current schedule status through a percent-complete shadings and a vertical “TODAY” line.

3.5.3. PERT/ CPM

The project (program) evaluation and review technique (PERT) was developed by the United States Navy Special Projects Office in the 1950s for scheduling the research and development activities for the Polaris Missile Programme. Since then, the application of PERT has spread rapidly throughout defense and space industry as well as in large industrial contracts in the field (Kati 2006:3). PERT is a statistical tool which can analysis and represent every task in a project, accelerate the completion of project by coordination of every task and reasonable arrangement of manpower, resource, time and money.

PERT is an arrow diagram which is similar to a flowchart. It depicts the order of every task within a project and indicates every activity's time and related costs.

After divide the whole project into many different activities, there are three estimated time and one expected time for every activity. They are: Optimistic time (O): the minimum possible time required to finish a task, Pessimistic time (P): the maximum possible time required to complete a task, Most likely time (M): the best estimate of the time required to achieve a task, Expected time (T_{ij}): the best estimate of the time required to complete a task. (Klastorin 2003) The following formula is used to calculate Expected time (T_{ij}) of every activity through three estimated time.

$$T_{ij} = \frac{O_{ij} + 4M_{ij} + P_{ij}}{6} \quad (1)$$

Variance is utilized to do deviation analysis of activities' time

$$\sigma_{ij}^2 = \left(\frac{P_{ij} - O_{ij}}{6} \right)^2 \quad (2)$$

The expected duration of the project (T_E) is the sum of expected time of each activity on the critical path

$$T_E = \sum_{(i,j) \in I} \frac{O_{ij} + 4M_{ij} + P_{ij}}{6} \quad (3)$$

The standard deviation of project time is

$$\sigma = \sqrt{\sum_{(i,j) \in I} \left(\frac{P_{ij} - O_{ij}}{6} \right)^2} \quad (4)$$

The following formula is utilized to do an evaluation of the probability regarding completing the project within a given time. The plan time (T): the planed completion duration of a project. The expected time (T_E): the expected duration of the whole project, equal to the sum of expected time of every process on the critical path. The sum of variance (σ): the sum of the variance of every process on the critical path.

$$\lambda = \frac{T - T_E}{\sigma} \quad (5)$$

Search the result of λ in normal distribution table, the probability of completing the project within a given time can result in from this formula.

The critical path method (CPM) was developed by E.I.DuPont Company along with Remington Rand Corporation. In the beginning, the intention of its development was to provide a technique for control of the maintenance of company's chemical plants. However, afterwards the use of CPM was extended to the field of cost and resource allocation. (Kanti 2006:2)

At present, CPM is applied widely in various areas of industrial activities. Through CPM, it is not essential to rush through and increase the cost of performing all the jobs; instead,

crashing of a few activities alone can serve the purpose of expediting a project with good saving. (Kanti 2006:3)

CPM is an algorithm for recruiting a set of project activities which require user to build a model of the project which involves the following:

- A list of all activities included in a project,
- The dependencies between every activity
- Logical end points such as milestones or deliverable items.
- The time (duration) required by each activity (Kanti 2006:3).

The most common information with respect to each activity's time included: the activity name; the normal duration time; the early start time (ES); the early finish time (EF); the late start time (LS); the late finish time (LF); the slack

Early Start	Duration	Early Finish
Task Name		
Late Start	Slack	Late Finish

Figure 2. CPM table (Armstrong-Wright 1969)

Figure 2 shows how to calculate the slack time for each activity, first determine an early start date to the first activity of project, plus duration to get the early finish date of the activity. Repeat this process until all early start & early finish date are confirmed. Afterwards, define a late finish date to the last task of project, minus its duration to get late start date. Repeat this process until all late start & late finish date are determined. The slack time of activity equals to the distinction between early start date and late start date.

The longest path of planned activities in the project is calculated, as well as the earliest and latest start and finish time of each activity. This process defines which activities are “critical” (any delay to “critical” activities will lead to postponement to the project) and which have “total float” (they can be delayed without making the project longer). In project management, a critical path is the array of project network activities which aggregate to the longest total duration. It determines the shortest time possible to complete the project (Armstrong-Wright 1969).

4. THE CURRENT STATE OF MANAGEMENT SYSTEMS IN THE GREATVIEW GMBH

4.1. Target organization

4.1.1. Greatview Group

“Greatview Aseptic Packaging Company is a multinational aseptic processing company with its head office based in Beijing, China. Founded in 2003, Greatview offers aseptic carton solutions and related services for dairy and non-carbonated soft drink companies whose products are fully compatible with standard roll-fed filling machines” (Wienrich & Wong 2013:1-3).

“Listed on the Main Board of the Hong Kong Stock Exchange, Greatview is the second largest supplier of roll-fed aseptic packaging material globally. The company operates in multiple locations across Asia, Europe, North and South America” (Greatviewpack 2014a).

Greatview group presently has four operating enterprises. Three of them are located in different cities in China, which are Beijing, Shanghai and Hong Kong. The last one is in Winterthur, Switzerland, in the meanwhile, three converting plants are located in worldwide, two of which are located in China, in Gaotang, Shandong and Helingeer, Inner Mongolia; the newest factory is Greatview Aseptic Packaging Manufacturing GmbH which is located in Halle (Saale), Germany (Greatviewpack 2014b).

With “Choice Creates Value” as the company’s philosophy, Greatview Group continue to improve its performance, until the end of 2013, Greatview hired over 1250 employees all

over the world and accumulated supplied over 40 billion package aseptic packaging materials to global liquid food industry (Greatviewpack 2014c).

4.1.2. Greatview Aseptic Packaging Manufacturing GmbH

Greatview Aseptic Packaging Manufacturing GmbH is part of Greatview Aseptic Packaging Co.; Ltd., which is one of the worldwide leading suppliers of aseptic beverage packages. This factory is located in Halle (Saale), Germany, and serves as the group's primary exporting unit. The factory has a 4 billion carton annual capacity and supplies packaging material to customers in Europe, the Americas, Middle East, Africa and the Far East. (Wienrich & Wong 2013:1-3).

Greatview Aseptic Packaging Manufacturing GmbH produces aseptic packaging material for non-carbonated beverages on behalf of Greatview Aseptic Packaging Europe GmbH, Winterthur (Switzerland). The main products of Greatview Aseptic Packaging Manufacturing GmbH includes: GA Brick Aseptic 200ml Base & Slim and GA Brick Aseptic 1000ml Base & Slim which are showed as **Figure 3**.



Figure 3. GA Brick Aseptic 200ml and 1000ml Base & Slim (Greatviewpack 2014d)

Thereby production is based on the designs which are provided by the customers. These designs are made available via the pre-press center of Greatview Aseptic Packaging Company Ltd., Beijing (China). The coordination with the customer is carried out by Greatview Aseptic Packaging Europe GmbH (Wienrich & Wong 2013: 5-7).

The current management system in Greatview GmbH utilized ISO 9001:2008 and BRC/IOP version 4: Global standard for packaging materials as standards. The requirement of integrating ISO 14001:2004 into existing management system is urgent because motivations are various for implementing ISO 14001:2004 standard in the case company. More specific, they are:

- Aseptic packaging has close connection with environment aspects, this is due to the fact that the products of aseptic packaging industry has strong environment features and it is necessary to incorporate the standards of ISO 14001:2004 into the existing quality management system to promote sustainable forests, reduce carbon emission and save energy, etc.
- Current customers and market has requirements of ISO 14001 certification and it is also a key element to access into new customers or markets with this requirement.
- Greatview Aseptic Packaging Company Ltd China branch already utilized the new management system with the standards of ISO 14001:2004, it is necessary to apply the same system in Germany branch in order to keep the head office and subsidiary within the same system and standards.
- Implementation of ISO 14001 standard will strengthen the awareness of environmental responsibility in the company.

4.2. Initial environmental review

An Initial environment review refers to a preliminary review of the current environmental program as well as system in the case company. Although it is not a compulsory document of ISO 14001, however, it is highly recommended because it offers a general impression of the current approach to environmental performance in the organization and it is helpful to identify which operation the target organization already have and what elements need to be improved according to the requirement of ISO 14001 standards.

The content of initial review can be divided into two components. The first one is named as “Environmental management in Greatview GmbH”. Based on the product and service offered by Greatview GmbH, the main content of the review concentrate on environmental communication, energy saving and consumption reducing control procedure, solid waste control procedure, noise control procedure, waste liquid control procedure and chemicals control procedure, etc. The second one is document review, the main purpose is to identify what measures in existing management system can be directly used according to ISO 14001 standards and which need small change or integration. It includes: environmental legal and other requirement, environmental training, emergency preparation and response, etc.

The initial review was executed by the author from October 2014. The possible methods included inspecting applicable documents in “Consense IMS|QMS|PMS” which is Software system of Greatview GmbH for documentation and information transfer as well as the compilation and visualization of processes and the control of documents (et. al.), interview relevant colleague and observation in workshop, etc.

4.2.1. Environmental management in Greatview GmbH

Halle (Saale) is a city in the southern part of German state Saxon-Anhalt which is about 130 kilometers from Berlin. It is a very important economic and educational center in

eastern Germany. The population of Halle is around 230,000 (city council of Halle 2014). Greatview GmbH is located in the “Star Park” which is in Halle A 14 Industrial Estate between Halle (10 km to Halle city center) and Leipzig (30km to Leipzig city center). The electricity, gas, water and sewage connections as well as a state-of-the-art telecommunication infrastructure is fully developed at the industrial estate and ecological compensatory measures around the industrial estate and two separate storm water storage basins take account of the environment (Starpark2014a).



Figure 4. An aerial view of “Star Park” (Starpark 2014b)



Figure 5. The Front of Greatview Aseptic Packaging manufacturing GmbH (Greatview GmbH 2014e)

Greatview GmbH is located in an industrial estate which is far from any neighborhoods; the transportation of Greatview GmbH did not cause significant distribution to local residents. The operation of Greatview GmbH does not cause external odors to surrounding environment.

The main waste which produced by Greatview GmbH are recyclable, non-recyclable and hazardous waste. There are seven different labeled trash containers available in the factory and every employee has responsibilities to do appropriate waste disposal is clearly written in standard operating procedure document. However, specific instruction concerning how to classify waste and how to monitor the effect of solid waste management is still missing in Greatview GmbH.

In Greatview GmbH, chemicals are mostly utilized in ink preparing, sewage treatment and laboratory. These chemicals are stored in a warehouse and materials safety data sheets (MSDS) to chemicals are available. Instruction regarding chemicals store, use and damage prevention are clearly described in documents. Nevertheless, a complete standard operating procedure regarding to the control of chemicals selection, procurement, transportation, storage, use and final disposal is not exist.

There are some standards with regard to noisy control in Greatview GmbH, for example, the sound intensity in workshop cannot exceed 85 dB. The inspection of noise within workshop is held every year. Nonetheless, a standard operating procedure concerning noisy control and management is required by ISO 14001 standards but cannot be found in Greatview GmbH management system.

The record of legal and other requirement is missing in Greatview GmbH, because the case company has no legal consultant. In the meantime, no colleagues have a professional knowledge of legal regulation or requirement as well. However, Greatview GmbH already plan to establish a system which can identify and access to company's legal and other requirement. Three legal consultant companies are evaluated by Greatview GmbH and the system might be built in the first quarter of 2015.

Following environmental measures are already applied in Greatview GmbH in order to produce with sustainable raw materials and reduce the energy consumption.

- Raw material from sustainable forests

According to Zhang (2013), Greatview began sustainable fiber sourcing in 2009, and won all COC certifications of three major global sustainable forest management systems-PEFC, SFI and FSC in 2010. Jeff Bi, who is Greatview CEO, said, “100% of paperboard purchased in Halle factory is certified by the FSC, PEFC for ‘Chain of

Custody’ . This is a milestone achievement for Greatview, who already holds the best record in the industry in terms of paper certification” .

- Save electricity and water consumption

At Greatview GmbH, a heat exchanger provides air conditioning for the entire plant. The electricity is derived from using the heat of laminator burner exhaust, extruder exhaust, and printer exhaust. In the meanwhile, a solid-cast transformers, low –attrition, power-saving device, is environment friendly, operating with full load, it can save 60,687 kWh annually, which equals a reduction of 52.83 tons of carbon dioxide emission. In Greatview GmbH, rainwater collected from the roof is reused to flush toilets and to water surrounding grasslands (Zhang 2013).

4.2.2. Initial document review

ISO 9001 and ISO 14001 have a similar management system structure. Even through going forward to ISO 14001 do not require a registration to ISO 9001. However, an existing quality management system will greatly simplifies the work required. The model Operating Procedures also acknowledge the possibility of having common Operating Procedures for both management systems (Edwards.2004).

Numerous QMS procedures in current management system of Greatview GmbH were appropriate as platforms when implementing EMS into practice. Appendix 1 describes the main correspondence between ISO 14001:2004 and ISO 9001:2008

Greatview GmbH use “Condense IMS|QMS|PMS” which is integrated management system software to record, maintain and track documents. The software is available to access through company’s intranet. The process and documents are main demonstrating as flow-chart with text descriptions of responsibility, methods, critical factors and records. There are additional instructions and links to templates support the descriptions of each

process.

The Consense system allows the displaying of several standards with the complete corresponding report system. Even though some SOP and template are still missing, the table of content for ISO 14001 is already established in Condense with other available standards such as ISO 9001 and BRC/Ion Version 4. It is not necessary to do major changes to existing document record system in Greatview GmbH according to ISO 14001 standards. In further steps, complement and complete ISO 14001 documents will be the main task.

After reviewing the existing management system in Greatview GmbH, some procedures such as internal communication, evaluation and selection of suppliers, document control, internal audits, non-conforming, corrective and preventive action system and management reviews can be directly used when implement ISO 14001. In the meanwhile, an initial list of additional required documents/ procedures is created.

The initial list of additional required documents / procedures:

- Environmental Aspects and Significant Environmental Aspects identification procedure and template
- List of legal and other relevant requirements
- Environmental objectives and targets and programmes
- External and internal communication procedures of environmental policy , performance or other information
- Control procedures for subcontractors / suppliers
- Training-related instructions and presentations.
- Operational control procedures e.g. waste management and energy saving management
- Emergency preparedness, especially from environmental angle

4.2.3. Summary of initial review

In summary, due to the fact that Greatview GmbH is the newest factory in the group company, some advanced environmental facilities were installed when establishing the factory. These installations offer an impressive improvement in Greatview GmbH's environmental performance. Nevertheless, Greatview GmbH did not begin to produce with full speed yet; more attention needs to be put on production. The disparities between current management system and ISO 14001 standards could be summarized as:

1. EMS relevant documents are incomplete
2. Most of employees lack an understanding of EMS and their environmental responsibility

Completing the EMS documents and improving employees' knowledge of EMS will be two emphases in next steps. To fulfill these goals, following items are raised as activities list in next implementation.

- Legal regulation regarding company's environment operation should be built
- Environmental programs which include objective and target need to be identify
- Procedures regarding applying influence to related parties' environmental behaviors need to be defined
- Procedures regarding communicating internally and externally on company's environmental policy, performance or other information should be established
- Operational control procedure concerning waste management and energy saving should be add in company's standard operation procedure
- EMS awareness and skills training need to be organized to strength the EMS awareness and technique within the company

- Preparation and response procedures to environmental accidents and incidents need to be created

5. THE IMPLEMENTATION OF ISO 14001

5.1. Project plan

5.1.1. Project human resource management

Human resource management of the project is explained by two methods. One is the introduction to project members' role & responsibility and another is the organization chart of the project. **Table 1** and **Figure 6** illustrate project members' role & responsibility and organization chart of the project separately.

Role	Responsibility
Top Manager	<ul style="list-style-type: none"> • To support EMS with management commitment • Approve some EMS document
EMS Manager & EMS intern	<ul style="list-style-type: none"> • Develop tailored ISO 14001 documentation • Implement an effective EMS • To achieve ISO 14001 requirement
Department Manager	To support the EMS with own functions
Frontline staffs	To understand the environmental impacts related to daily working activities, and to control them.

Table 1. Project members' role and responsibility

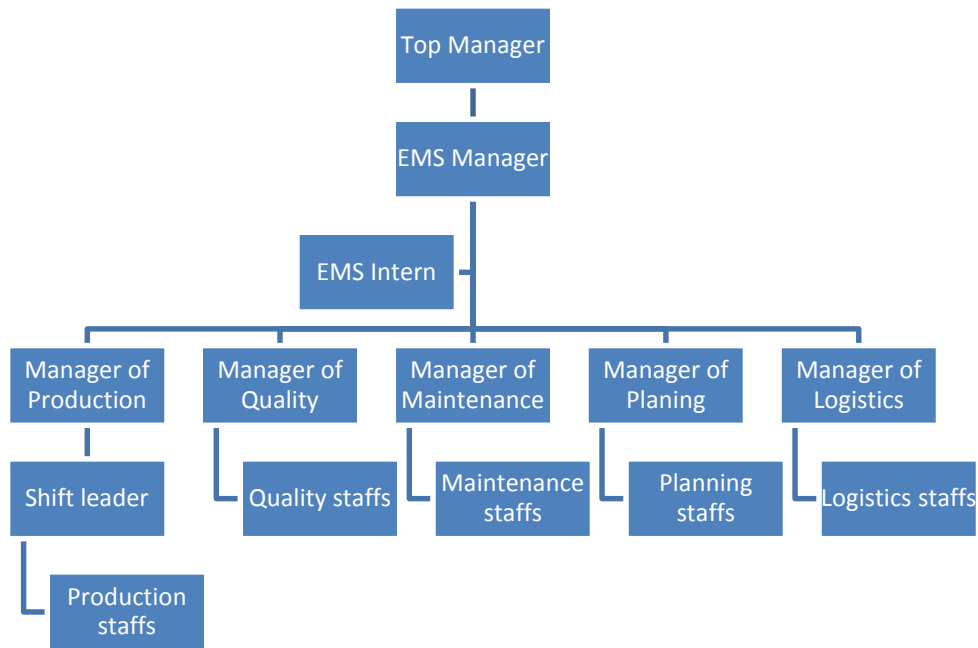


Figure 6. Project organization chart

5.1.2. Project time

To describe the timetable of ISO 14001 implementation, a Gantt chart (Appendix 2) was created. On the left side of Gantt chart, there are a list of activities within project. Every activity is defined based on the requirement of ISO 14001 standard and the result from initial review. Time scale is on the top side. Every activity is represented by a horizontal bar. The length of which represent the duration of activity and the red color bar refer to critical task. Gantt chart offer a clear definition of activity names, type (terminal or summary), start date and end date, duration and independence. With software “Openproj”, percent-complete shadings and a vertical “TODAY” line help manager track the current status of the project.

Critical Path Method (CPM) could define which activity is critical activity through calculate the slack time for every activity. If an activity’s slack time is less or equals to 0, then this activity can be defined as critical activity.

In this project plan, Project Evaluation and Review Technology (PERT) are primarily used to calculate every task's duration. To achieve this goal, “three times estimate” which refers to estimate pessimistic time, most likely time and optimistic time for each activity, is utilized. Under the assumption of Beta distribution, use traditional probability theory to estimate the duration of the expectations (Expected value) and variation number (Variance).

The following **Table 2** describe P_{ij} (pessimistic time), M_{ij} (most likely time), O_{ij} (optimistic time), T_{ij} (expectation time) and σ_{ij}^2 (variance of activity time) of every critical activity.

In this form, P_{ij} , M_{ij} and O_{ij} is estimate by the project manager and the author according to previous experience and some literatures such as ISO 14001 template user manual and other similar size company's ISO 14001 implementation project plan.

Activity	P_{ij}	M_{ij}	O_{ij}	$T_{ij} = \frac{O_{ij} + 4M_{ij} + P_{ij}}{6}$	$\sigma_{ij}^2 = (\frac{P_{ij} - O_{ij}}{6})^2$
Initial Environmental review	7	5	3	5	0.44
Management commitment	4	2	1	2.2	0.25
Identify EA and SEA	5	3	1.5	3.1	0.34
Develop objective & target with program	8	6	4	6	0.44
Environmental training	4	3	2	3	0.11
Operational control	12	8	4	8	1.78
Monitoring and measuring	12	8	4	8	1.78
Non-conforming corrective	4	3	2	3	0.11
Control of record	3	2	1	2	0.11
Management review	4	3	2	3	0.11

Table 2. Prediction table about the completion time of every critical activity (Unit: Weeks)

The total completion time of the whole project equals to the sum of all critical activities' completion time.

$$T_E = \sum_{(i,j) \in I} \frac{O_{ij} + 4M_{ij} + P_{ij}}{6} = 43.3(\text{weeks}) = 216.5(\text{days})$$

The standard deviation of project completion time can be calculated by the following formula.

$$\sigma = \sqrt{\sum_{(i,j) \in I} \left(\frac{P_{ij} - O_{ij}}{6} \right)^2} = 2.34(\text{weeks}) = 11.7(\text{days})$$

Because the completion time of the project is a random variable which obey to normal distribution. According to empirical rule, the following result can be summarized.

Completion time of project	Probability
204.8 to 228.2	68%
193.1 to 239.9	95%
181.4 to 251.6	99.7%

Table 3. The probability of completion time of project (unit: days)

From **Table 3**, the whole project is nearly impossible to be finish less than 196.1 days, in the meantime, the probability of project duration exceed 266.9 days is also very low.

5.2. Environment policy

Environment policy establishes principles for organization's environmental responsibility and required environmental performance. In Greatview Group webpage, green and sustainability are key words. Greatview also write sustainability in company's mission which is "Greatview's mission is to bring significant value to our customers in

the liquid food industry by supplying a high quality, competitive and sustainable packaging choice” (Greatviewpack 2014).

The existing company policy was formulated together with Greatview management teams and after several draft, the final version was approved by CEO of Greatview Group in April 2011(Appendix 3), because the company policy is created from the whole group corporate point of view and Greatview Chinese factories already got the ISO 14001 certification. The existing company policy conform the requirement from ISO 14001 standard which includes complying with legal requirement, preventing pollution, and achieving continual improvement through development of environmental performance, etc. So environmental policy is already included in the company policy and no modification is necessary to the current company policy.

5.3. Identification of EA and SEA

Three main elements are included in planning phase, they are:

- Identification of applicable legal requirements,
- Identification of EAs and SEAs,
- Set objectives, targets and programs.

As the reasons mentioned in initial review, Greatview GmbH will outsource its legal requirements registration to a legal consultant company. The emphases are focus on another two elements.

The author held ISO 14001 training (Appendix 4) presentation for managers from five main departments in Greatview GmbH. The purpose of this training is to make every department manager understand what is ISO 14001, why does Greatview GmbH need ISO 14001 certification and how to identify EAs and SEAs. In the presentation,

explanation regarding the concept of ISO 14001, the main benefit which ISO 14001 brings to the company and the measures to identify EA & SEA are given to every participant.

Meanwhile, a SOP documents which named “Identification and Evaluation of EA” (Appendix 5) is created in “Consense IMS|QMS|PMS”. The documents describe how to identify the Environmental Aspects (EAs) in Greatview GmbH’s activity, products or service. Evaluate its impact and confirm Significant Environmental Aspects (SEAs). To make sure Environmental Aspect (EA) be controlled.

Another template which named “identification of EA template” (Appendix 6) is uploaded into Consense at the same time. The operation of Greatview GmbH is divided into 7 tables which are: office, restaurant, infrastructure maintenance, warehousing and logistics, monitoring laboratory, maintenance of production equipment and facility, and production. Every manager is responsible for identifying EAs and SEAs within his/her department and recording in relevant tables.

To complete this process, at first, define an object which may include activity, products or services. Secondly, identify the possible environmental aspects within the object. Furthermore, environmental impacts which includes use of electricity, use of gas, use of water, use of raw material and natural resources, release to water, release to land, waste and byproduct, energy emitted and emission to air, etc. are evaluated through multiple “×” mark. Finally, evaluation of Significance is applied. Two methods are utilized when Greatview GmbH identify its SEA. Judgment method is used as the first step of evaluation, Any EA have the following features can be directly judge as SEA:

- Consuming of electrical energy;
- Expect to have a serious environmental impact under abnormal or emergency situation;

- Pollutant emissions exceed regulatory standards or legal requirements; emission of waste liquid;
- Disposal of hazardous solid waste;
- Potential chemical spills, fuel fire.

For EAs which not be judged as SEAs, a technology methodology is applied. The critical method is present as the following **Table 4**. Five elements are considered when evaluation Significant Environmental Aspect. Employees need to evaluate each element according to its degrees (from 1 to 5). The total points (M) for every EA equal to the sum of five elements' points. When $M=A+B+C+D+E \geq 15$, those EAs are recognized as SEAs.

Elements Points given	A	B	C	D	E
	Occur frequency	Scope of influence	Degree of public concern	Control status	Hazard seriousness
5	Daily or continuous	Influence beyond the company	Social extremely concerned	Poor control, must modify	Very large
4	Once a week	Affect the Company	Regional extremely concerned	Poor control Enhance control system	Large
3	Once a month	Affect the department	Regional general concern	Control is ok Enhance control system	Medium
2	Rare(once a few months)	Affect the class	May concern	Control is ok Control system exist	Small
1	Hardly occur	Affect the position	No concern	Control well	Very small

Table 4. Technological method to determine SEA

The result can be summarized from collecting data (Appendix 7), SEAs of Greatview GmbH concentrate in maintenance, warehouse, quality and production departments. A further research and discuss will be arranged in these department in order to identify remedy for SEAs.

5.4. Develop objectives and targets with programs and procedures

After identification of EAs and SEAs, environmental objective can be set through comprehensive consideration of SEAs and legal and other requirement, etc. A target can be directly expressed as a particular level of performance, or may be indicated as a common way, and is further illustrated by more targets. When the target is defined, it have to be met by the requirement to measure in order to confirm the acquirement of the concerning objectives. Targets should be included in the time frame specified by the program delivery.

5.5. Environmental training

Table 5 shows that three types of environmental training could be arranged in Greatview GmbH.

Numb	Type of training	Audience	Purpose
1	Strengthen environmental awareness	All employees	In order to obtain commitment of the organization's environmental policy, objectives and targets, and transport awareness of personal responsibility
2	Training in environmental management system requirements	Managers from main departments	To coach on how to meet requirements, coordinate procedures, etc
3	Skills improvement	Employees who have environmental responsibilities	To improve performance in field of the organization

Table 5. Environmental Training in Greatview GmbH

The first training is held for all employees, the purpose of this training concentrate on publicizing the environmental policy, objectives and targets of company's environmental management system and defines individual responsibility for employees.

The second training is organized for managers from main departments. The purpose is to discuss the responsible of every department and how to meet the requirement of ISO 14001. The last training is arranged for employees with particular environmental responsibilities. For example, a training regarding new work instruction could better the performance of the employee who is in charge of waste management. The first training might be completed by two or three convocation with different shift workers in

workshop. The second training could be finished by one meeting with all department managers. The last training would be completed within one meeting. However, the host should prepare different work instructions for employees with different environmental responsibilities.

5.6. Environmental communication

Greatview GmbH has existing external and internal communication procedures. Internal communication methods includes Daily Production Report, Morning Meeting, PPI meeting, bulletin boards, complain/suggestion box, and email, etc. Specifically, employees record daily production information in Daily Production Report every day. If there was a problem which was not be solved on that day, a discussion will be arranged in the morning meeting on next day. PPI meeting is held by shift leader to discuss production issues with operatives when it is necessary.

External communication methods contains annual/interim reports and email which can be found in company's websites. More specific, Greatview GmbH has three different emails for external communication which are: commercial contact request, application and press.

The possible improvement could be expanded these communication channel to also cover environmental issues.

5.7. Relevant parties' environmental behavior control

Some relevant parties such as engineer contractor and main raw material supplier; they are controlled by Greatview Chinese facility. A qualification and environmental

assessment would be made before signing contract with suppliers. Environmental terms also are defined within the contract. For instance, all the raw paper which are used in Greatview GmbH has a PEFC or FSC certification. According to the contract, every batch of raw paper must have a PEFC, FSC certificate when they are adopted by Greatview GmbH. Only when contractors or suppliers meet the requirement of Greatview's environmental management system, contracts would be confirmed.

The main relevant parties in Greatview GmbH include:

- Transportation Company
- Solid waste and waste liquid processing company
- Chemicals suppliers

With respect to Transportation Company and waste processing company, Greatview GmbH would have a qualification and environmental assessment before cooperation in order to ensure these companies have a qualification to do their job. Concerning chemicals suppliers, the amount of chemicals consumption is not big enough to sign a contract. However, considering chemical's environmental impact is clearly indicated in chemical procurement SOP. Employees are requested to buy chemicals with less environmental impact.

To complete the SOP of relevant parties' environmental behavior control, a clear classification of relevant parties that based on its environmental impact should be defined. For instance, all relevant parties of Greatview GmbH can be classified as:

- Important relevant party
- General relevant party
- Other relevant party

Important relevant party includes: main raw material supplier, Solid waste and waste

liquid processing company and chemicals suppliers. General relevant party contain: engineering contractors, transport companies, insecticide companies, catering companies, landscaping companies and cleaning companies. Other relevant parties involve other material supplier.

Different degrees of influence will be applied to three relevant parties. Regarding general relevant party and other relevant party, company's environmental policy should be conveyed to get their understanding and assistance.

With regard to important relevant party, contact department should not only convey company's environmental policy to get their understanding and assistance but also sign the environmental protection contract/ agreement or add environmental terms in the relevant contract/ agreement to clarify responsibilities and duties of environmental protection.

5.8. Operational control procedures

Operational control is applied to meet company's commitment of environmental policy, accomplish its objectives and targets, comply with applicable legal requirements and other requirements which are set by company and manage its significant environmental aspects.

According to Greatview GmbH's environmental policy and significant environmental aspects, following operational control procedures will be created in integrated management system.

- Waste liquid management
- Noise control
- Chemical control management

- Energy saving and consumption reducing management
- Solid waste control

The operational control procedures of Greatview GmbH concentrate on the following elements:

- Rational use of resources
- Strict management of hazardous chemicals
- Effective control of waste and pollution

The purpose of this step is to control these elements. The methods that utilized in operational control are to create related Standard Operational Procedure with clear identification of related department's responsibility. In the meantime, necessary personnel training will be arranged to responsibility personnel in order to confirm responsible employee has abilities to deal with corresponding elements.

For instance, SOP of solid waste control (APPENDIX 8) should include waste classification, different disposal ways to recyclable, non-recyclable and hazardous waste and department responsibility.

5.9. Emergency preparation and response

Emergency preparation and response refers to a procedure which identifies potential emergency situations and potential accidents, which can have an impact on the environment and how it will respond to them. (DIN 2009:19)

In Greatview GmbH, an SOP which named alarm planning was already established. In this document, a definition regarding every accident and respond to actual emergency situations are clarified. More specific, the definition of accident includes fire, accident,

oil, diesel and chemical alarm, Ozone alarm, bomb threat, sabotage and demonstration.

For example, according to the document, fires are classified as: small fire, medium fire and major fire. Small fire includes smoldering fires on a smaller scale, as well as fires with open flames which are limited locally and cause no current danger to people as well as the operation, and can be extinguished by using a hand fire extinguisher or by using the fire brigade with acceptance of one or two C - pipes.

Medium Fire includes smoldering fires of a larger extent as well as fires with an open flame, which

- Endanger persons and / or
- Interfere with the operational process and / or
- Require an increased use of persons because of the expansion of the fire.

These fires cannot be extinguished using a hand fire extinguisher. They require the usage of fire brigade.

Major Fire defined as a major plant fire that cannot be fought with our own personnel and material.

Actions concerning how to react to fire includes:

- By hearing the fire alarm, the machines have to be stopped immediately. Gathering place will be accessed using the escape routes.
- There is no need to open the smoke alarm trigger. Instead the fire brigade is responsible.
- Information: The fire brigade has access to a general key to our house. (The general key is kept by the security guard)

Actions regarding respond to actual accident, how to mitigate the damage and a list of

key personnel and aid agencies are described in the document. However, procedure concerning actions required to minimize environmental damage, training plans, testing of effectiveness and process of post-accident evaluation which define corrective and preventive actions are still missing in this SOP. To fulfill the requirement of ISO 14001, the content which mentioned above need to be complemented and several trainings concerning emergency response should be arranged.

5.10. Internal audits

Due to the fact that Greatview GmbH has a complete internal audits process for its QMS auditing. The same procedure can be applied in EMS as well. The auditing can be divided into:

- Product audit

Production audit is performed to check whether the products match with customers' requirements

- Process audit

Process audit is performed to verify the process capability regularly and to identify improvement opportunities

- System audit

System audit is carried out once a year to check that the management system fulfills the requirements of ISO 9001, BRC/IoP and ISO 14001

However, the only diffidence is EMS audit require a new audit questionnaire which contains ISO 14001 requirements. The data from the questionnaire will be evaluated and summarized as: major non-conforming, non-conforming and improvement suggestions

The audit report is established after the questionnaire survey. The main contains include: results from audits, identified deviations, corrective and preventive actions and a deadline for the implementation of improvement methods.

5.11. Control of records

The effectiveness of the corrective and preventive actions are reviewed after a reasonable time by the system Officer and further corrective action should be initiated if necessary. The system Officer evaluates the reports and activities and provides these results as input in management review.

5.12. Management review

Since Greatview GmbH has a valid QMS, the management review exists in company's management system. The management meetings are held once a month in Greatview GmbH and management reviews are held within the meeting. The system officer is responsible for collecting the data regarding management system for evaluation and present it in management reviews.

6. DISCUSSION

6.1. The strength and weakness of ISO 14001 implementation at Greatview GmbH

Based on the analysis of existing management system, feedback from employees as well as the literature of ISO 14001 standards. The main strength of ISO 14001 implementation at Greatview GmbH are summarized as: at first, the top manager has a determination to implement ISO 14001 in order to establish EMS in Greatview GmbH. More exactly, the management commitment significantly increasing the effectiveness of implementation process. Furthermore, Greatview GmbH already built its management system according to ISO 9001 and BRC/Iop. Numerous documents and procedures in existing management system fulfill the requirement of ISO 14001. Besides, since employees had contact ISO standards before, it becomes easier for them to understand and adopt the new integrated management system which based in both ISO 9001 and ISO 14001 standards. Finally, Greatview GmbH had significant environment performance due to some advanced environmental facilities that were installed when establishing the factory. Thus it may enhance the impression of Greatview GmbH in ISO 14001 authority audit.

The main weakness in Greatview GmbH which may affect the successful ISO14001 implementation includes: to begin with, because Greatview GmbH was a very new factory in the group company. More resources and attention still concentrate on improving the production speed. Therefore, it may lead to the scarcity of resources and execution personnel in EMS implementation. Moreover, employees, especially from operational level, are generally lack of the awareness of environmental responsibility which related to their daily work. As a result, it would increase the implementation hindrance. Last but not least, lack of legal consultant in Greatview GmbH may affect its

EMS implementation process. As a matter of fact, Legal and other requirement registration is very important basic data which may affect the identification of objective, target and programs within the project. However, since ISO 14001 implementation project and finding an appropriate legal consultant company had to process at the same time. It could result possible rework in the future.

6.2. Improving suggestions to ISO 14001 implementation

Since the author participated part of the project implementation. Several hurdles were found in the implementation process.

At first, some employees from operational level could not communicate with English very well. It is hard for them to read English documents individually as well. The barriers of language decreased the communication efficiency.

Moreover, some employees may not understand the importance of the implementation of ISO 14001. Some of them had negative attitude when deal with their task, which may lead to the failed project execution.

Last but not least, in some implementation steps, EMS manager had to collect the results of tasks from the operational staffs by themselves. It may not only add the unnecessary workload to EMS manager; but also decrease the implementation efficiency.

To solve the problems, three improving measures could be applied. First of all, a comprehensive ISO 14001 training with management commitment should be transformed to all level of employees within the case company. The purpose of these training is to ensure every employee understand the importance of this project and the determination from top manager. In the second place, a clear Top-down personnel

organizational structure should be identified. The goal of this work structure is to ensure every member's responsibility and labor division. For instance, when collecting the task result, department managers are responsible for collecting result from operational employees. EMS manager only need to contact every department manager to get result. Lastly, managers from different department may choose one operational employee from their own department. This employee could act as EMS representative who is in charge of reporting EMS result to their department manager. Hence, the responsibility of every employee is clearly defined and the fulfillment of every employee's duty is easy to track.

Overall, the good way of implementing ISO 14001 in an aseptic packaging manufacturing enterprise should include the following elements:

1. Top management commitment and support

The good way of ISO 14001 implementation is from top to bottom. A determination to implement ISO 14001 from the top manager will significantly enhance the executor's motivation. The cooperation from other departments or employees will be easier to organize with top management commitment as well. In order to secure the commitment, a training which improve the importance of ISO14001, highlights the correlative benefits within EMS, predigest the steps of ISO 14001 implementation, and the possibility of integrating with other management systems should be offered to the top manager in the case company.

2. Efficient and effective project plan

Since implementation of ISO 14001 is a long-term project, an efficient and effective project plan is essential to successfully complete the project in time. More specific, the project management of ISO 14001 implementation should include the following contents: Scope, Time, Cost, Quality, Communication and Risk management

Accordingly, appropriate project management software is a good assistance for project management. Greatview GmbH utilized software which named Openproj. The most important content such as WBS, time, cost, and quality could be managed with this software.

3. Close cooperation between departments

Because the input and action of all employees across the enterprise are required in a successful implementation of ISO 14001, close cooperation and interaction from different department can elevate efficiency of project implementation. Objectively speaking, responsibilities and respective roles of each function should be clearly defined and well communicated to every department. In the meanwhile, close cooperation between departments should be arranged, in order to achieve fast and comprehensive ISO 14001 implementation accordingly.

6.3. Limitation of research

The thesis concentrate on preparation and plan of the “ISO 14001 implementation” project. In the early component of the project, the author could record the realistic measurements and discuss the result when the research is conducted. However, due to the limit internship period, for the rest of activities, the author could only offered recommendation according to the compaction between existing situation review and the requirement of ISO 14001 literature. If the company continued to complete the project based on the research, more discussion regarding implementation details of the rest of activities may be made according to actual requirement. Besides, the research lacks the evaluation of project risk, resource cost and quality control due to limited conditions. For further steps, a discussing concerning project cost and quality control could be clarified.

7. CONCLUSIONS

Successful integrating the Environment management system which according to the ISO 14001 standard with existing ISO9001 and BRC/Iop based management system is the purpose of this project. In order to define a good implementation method, at first, an initial environmental review was utilized to identify the disparity between existing management system and the requirement of ISO 14001 literatures. Afterwards, some project management tools were exploited such as PERT & CPM in order to establish an effective project plan. Meantime, Openproj, which is project management software, was exercised to display the scope, time, cost and quality of the project. Finally, exhaustive description concerning implementation methods are given in order to explain clear what measures should be applied and how to implement them effectively.

The research question regarding “what would be a good way of implementing ISO 14001 in an aseptic packaging manufacturing enterprise” could be answered by project plan and description of measures in every steps in the project. Overall, a good way of implementing ISO 14001 in aseptic packaging manufacturing enterprise should include top management commitment and support, Efficient and effective project management and close cooperation between departments.

The further research may focus on how to reasonable arrange human resource and budget in every activities within the project as well as how to control the project risk and quality. If it is applied, the result will facilitate a better project implementation with less time and money consuming.

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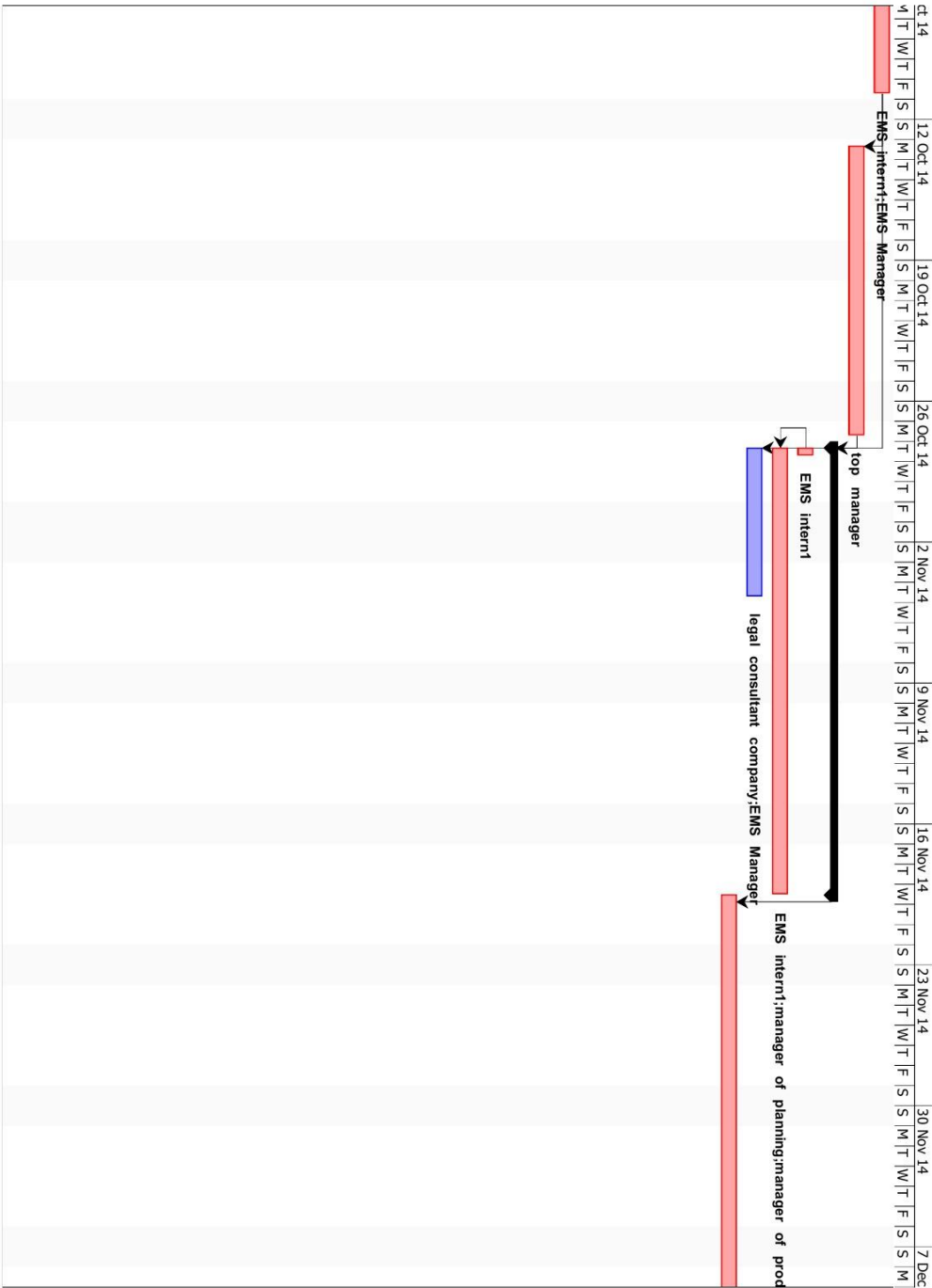
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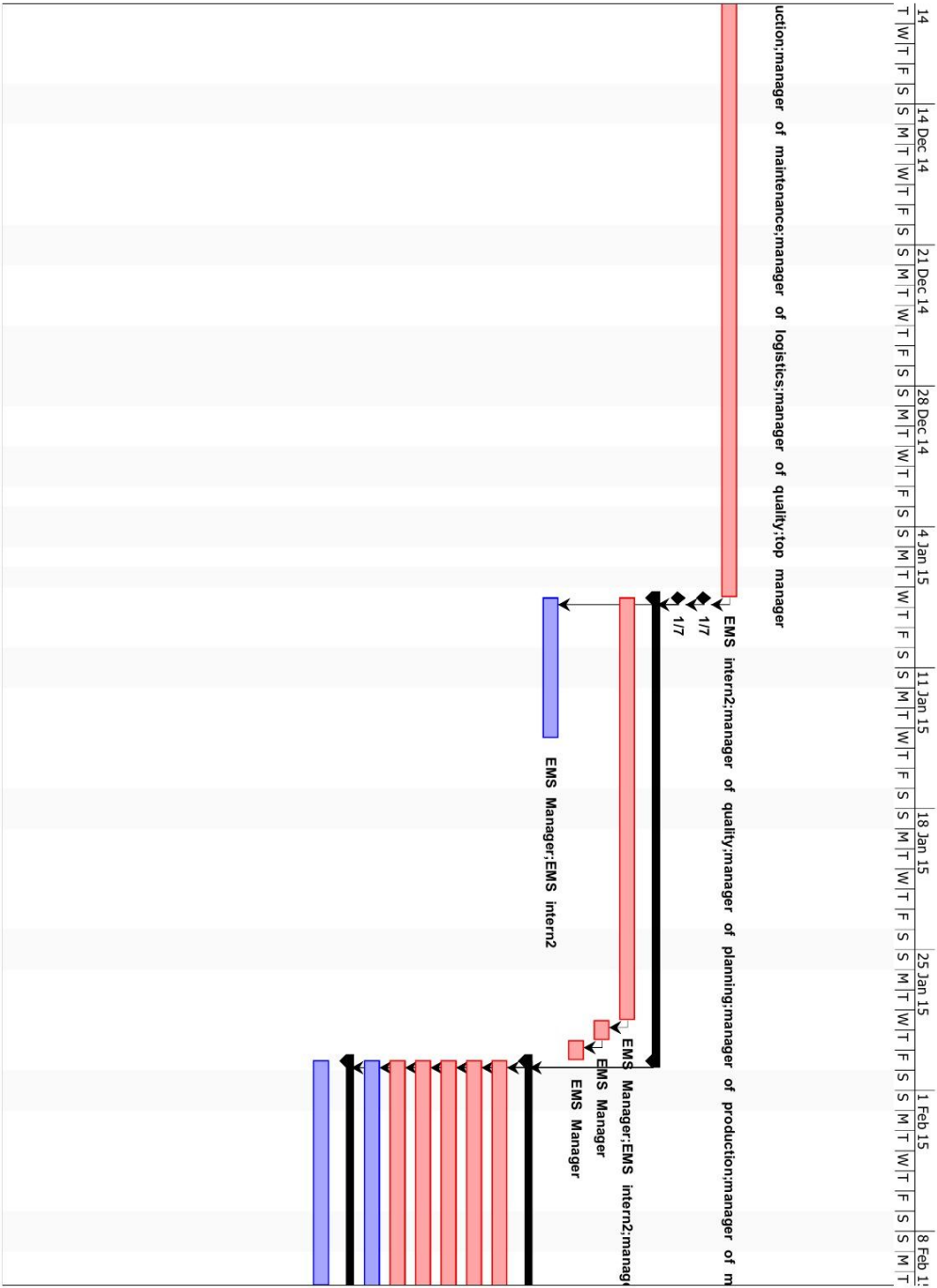
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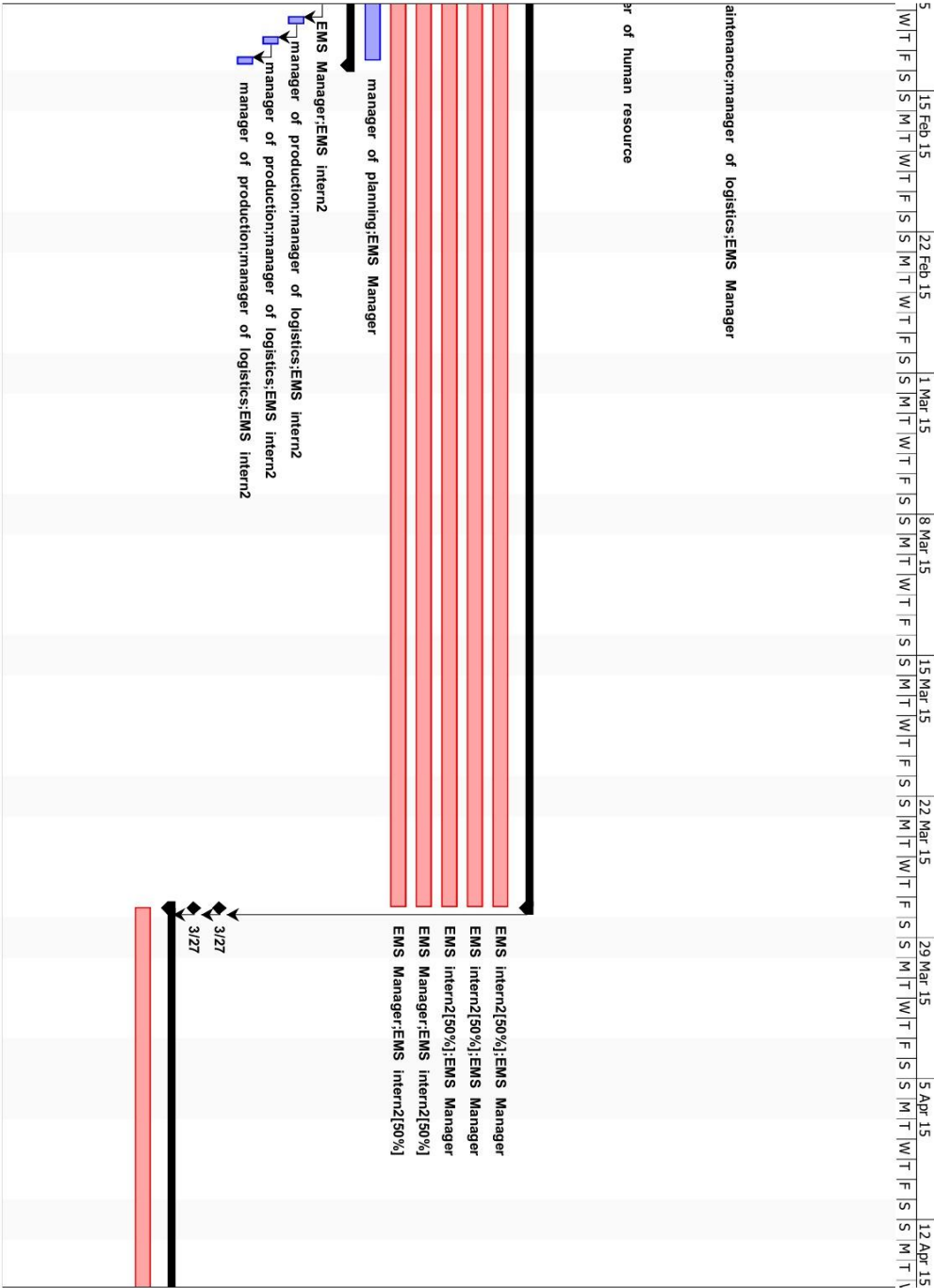
APPENDIX 1. Correspondence between ISO14001:2004 and ISO 9001:2008(DIN 2009:40-42).

ISO 14001:2004		ISO 9001:2008	
Introduction		0.1 0.2 0.3 0.4	Introduction (title only) General Process approach Relationship with ISO 9004 Compatibility with other management systems
Scope	1	1 1.1 1.2	Scope (title only) General Application
Normative references	2	2	Normative references
Terms and definitions	3	3	Terms and definitions
Environmental management system requirements (title only)	4	4	Quality management system (title only)
General requirements	4.1	4.1	General requirements
Environmental policy	4.2	5.1 5.3 8.5.1	Management commitment Quality policy Continual improvement
Planning (title only)	4.3	5.4	Planning (title only)
Environmental aspects	4.3.1	5.2 7.2.1 7.2.2	Customer focus Determination of requirements related to the product Review of requirements related to the product
Legal and other requirements	4.3.2	5.2 7.2.1	Customer focus Determination of requirement related to the product
Objectives, targets and programme(s)	4.3.3	5.4.1 5.4.2 8.5.1	Quality management system planning Coninual improvement
Implementation and operation(title only)	4.4	7	Product realization (title only)
Resources,roles,responsibility and authority	4.4.1	5.1 5.5.1 5.5.2 6.1 6.3	Management commitment Responsibility and authority Management representative Provison of resources Infrastructure
Competence,training and awareness	4.4.2	6.2.1 6.2.2	Competence, training and awareness
Communication	4.4.3	5.5.3 7.2.3	Internal communication Customer communication
Documentation	4.4.4	4.2.1	requirements)General
Control of documents	4.4.5	4.2.3	Control of documents

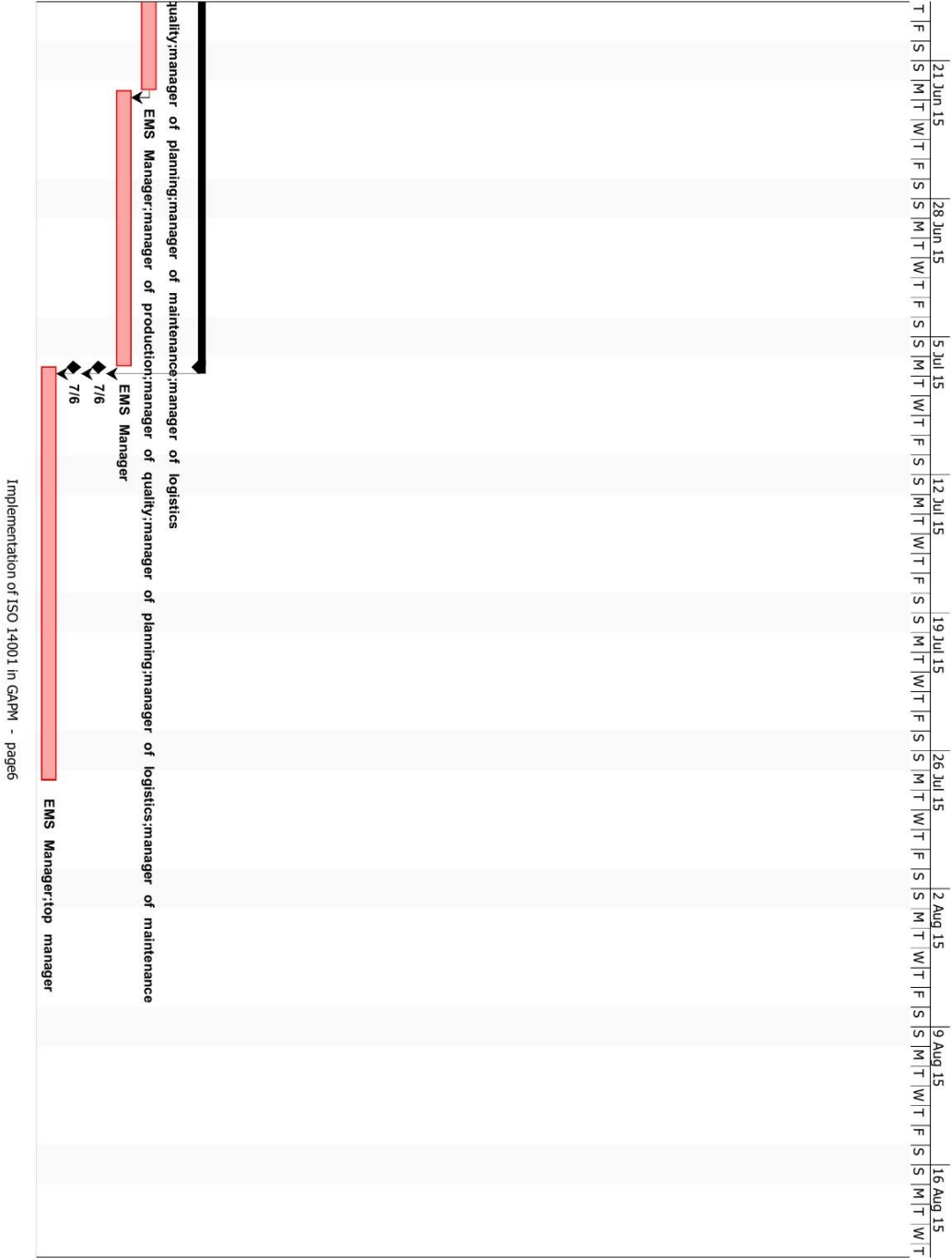
Operational control	4.4.6	7.1 7.2.1 7.2.2 7.3.1 7.3.2 7.3.3 7.3.4 7.3.5 7.3.6 7.3.7 7.4.1 7.4.2 7.4.3 7.5.1 7.5.2 7.5.5	Planning of product realization Determination of requirements related to the product Review of requirements related to the product Design and development planning Design and development inputs Design and development outputs Design and development review Design and development verification Design and development validation Control of design and development changes Purchasing process Purchasing information Verification of purchased product Control of production and service provision Validation of processes for production and service provision Preservation of product
Emergency preparedness and response	4.4.7	8.3	Control of nonconforming product
Checking(title only)	4.5	8	Measurement, analysis and improvement(title only)
Monitoring and measurement	4.5.1	7.6 8.1 8.2.3 8.2.4 8.4	Control of monitoring and measuring equipment (Measurement, analysis and improvement) General Monitoring and measurement of processes Monitoring and measurement of product Analysis of data
Evaluation of compliance	4.5.2	8.2.3 8.2.4	processes Monitoring and measurement of product
Nonconformity, corrective action and preventive action	4.5.3	8.3 8.4 8.5.2 8.5.3	Control of nonconforming product Analysis of data Corrective action Preventive action
Control of record	4.5.4	4.2.4	Control of records
Internal audit	4.5.5	8.2.2	Internal audit
Management review	4.6	5.1 5.6 5.6.1 5.6.2 5.6.3 8.5.1	Management commitment Management review (title only) General Review input Review output Continual improvement







[illegible]



APPENDIX 3. Environmental policy



Environmental Policy
Revision 0.0

Greatview Aseptic Packaging Manufacturing GmbH is part of Greatview Aseptic Packaging Co.; Ltd., which is one of the worldwide leading suppliers of aseptic beverage packages. We comply with laws and satisfying customer requirements to provide good, safe and hygiene packages! Improving continually and producing “greenly” to found the world-class Greatview brand in the packaging industry!

- Compliance with laws — To strictly comply with the contract, as well as all laws, rules, regulations and other regulations and to make updates accordingly in order to ensure the legal operation of the Company’s quality, environment and hygiene management system.
- Satisfying customer requirements — to ensure the fulfilment of all external and internal requirements and to provide satisfying products and services for the customers.
- Providing good, safe and hygiene packages — To provide high-quality products complying with food safety rules by means of strict, quality-oriented management, clean production and constant pursuit of excellence!
- Continual improvement — Pursuit of continual improvement (to improve product quality, environment-protection measures, and the applicability, completeness, effectiveness and target of the management system) is the core of the Company’s management system operation.
- Green production — to set up and improve environment-protection objectives in order to save energy, reduce emissions and prevent pollution for a clean production and a “green” Greatview.

Greatview as the world-class brand in packaging industry — With “Choice Creates Value” as the Company’s philosophy, Greatview will be the leader of the global liquid food packaging system in the year 2030 by adding value in the liquid food industry and benefiting customers all over the world with alternative packaging choice!

APPENDIX 4. ISO 14001 training material

 <p>CREATVIEW</p> <h2>ISO 14001 Awareness and how to identify EA & SEA Training</h2> <p>CREATVIEW Energy Technology Co., Ltd. Confidential</p>	 <p>Content</p> <ul style="list-style-type: none">• What is ISO 14001• Why get ISO 14001 certification• ISO 14001 framework• How to identify Environmental Aspect(EA)• How to determine Significant Environmental Aspect (SEA) <p>CREATVIEW Energy Technology Co., Ltd. Confidential</p> <p>CREATVIEW</p>
 <h3>What is ISO 14001</h3> <ul style="list-style-type: none">• An Environment management system (EMS) is a comprehensive and systematic system which is used for achieving its environmental goals through reducing the consuming, prevent pollution and increase the operating efficiency• ISO 14000 is a family of international standards of Environmental Management system• ISO 14001 sets out the criteria for an environmental management system and it is the only standard which can be certified• The newest version is ISO 14001:2004, the final version can be expected by the end of 2015 <p>CREATVIEW Energy Technology Co., Ltd. Confidential</p> <p>CREATVIEW</p>	 <h3>Why get ISO 14001 certification</h3> <ul style="list-style-type: none">• Reduced cost of waste management• Savings in consumption of energy and materials• Improved corporate image among regulators, customers and the public• Customer requirement. It help to get new business• Keep the same management system standards with Greatview China• strengthen the awareness for environmental influences of the company. <p>CREATVIEW Energy Technology Co., Ltd. Confidential</p> <p>CREATVIEW</p>

<h2>ISO 14001 framework</h2>  <p><small>CREATIVIEW Design & Strategy Co., Ltd. Confidential</small></p> <p>CREATIVIEW</p>	<h2>How to identify Environment Aspect</h2> <ul style="list-style-type: none"> • The elements of activities, products and services in an organization which can interact with the environment are environmental aspects • The more the better • Every relevant department has responsibility to identify its EA • Environmental impact and evaluate SEA according to the SEA criteria • Environmental coordinator collect EA from every department, summarized and confirm SEA according to the SEA criteria • Factory manager approve SEA <p><small>CREATIVIEW Design & Strategy Co., Ltd. Confidential</small></p> <p>CREATIVIEW</p>
<h2>The following approach could be consider</h2> <ul style="list-style-type: none"> • Emission to air • Releases to water • Releases to land • Use of raw materials and natural resources • Use of energy • Energy emitted e.g. heat, radiation, vibration • Waste and by-products • Physical attributes, e.g. size, shape, color, appearance <p><small>CREATIVIEW Design & Strategy Co., Ltd. Confidential</small></p> <p>CREATIVIEW</p>	<h2>The Following aspects can be consider</h2> <ul style="list-style-type: none"> • Design and development • Manufacturing processes • Packaging and transportation • Environmental performance and practices of contractors and suppliers • Waste management • Extraction and distribution of raw materials and natural resources • Distribution, use and end-of-life of products • Wildlife and biodiversity <p><small>CREATIVIEW Design & Strategy Co., Ltd. Confidential</small></p> <p>CREATIVIEW</p>

Any EA have the following features can be directly judge as SEA:

- CREATIVITY: August Publishing Co., Inc. (Continued)



CREATIVITÄT: Jüngster Packaging Co., Inc. Conshohocken

GREATVIEW

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APPENDIX 5. Identify EA & SEA SOP



Identification and Evaluation of Environmental Aspects

Revision 0.0

Contents

1. Objective.....	1
2. Scope.....	1
3. Responsibility.....	1
4. Identify Environmental Aspect	1
5. Evaluation method of Significant Environmental aspect.....	2
5.1 Judgment method	2
5.2 Technology method	2
6. Record	3



1. Objective

The documents describe how to identify the Environmental Aspect (EA) in Greatview Aseptic Packaging Manufacturing GmbH's activity, products or service. Evaluate its impact and confirm Significant Environmental Aspect (SEA). To make sure Environmental Aspect (EA) be controlled.

2. Scope

The document is applicable for the identification of EA, Evaluation of SEA and update of EA.

3. Responsibility

1. Every relevant department has responsibility to identify its EA and environmental impact
2. Environmental coordinator collect EA from every department, summarized and confirm SEA according to the SEA criteria
3. Factory manager approve SEA

4. Identify Environmental Aspect

Environmental standard ISO 14001 defines environmental aspect as an element of an organization's activities, products or services that can interact with the environment.

An organization should identify environmental aspects within the scope of its environmental management system that are associated with its past, ongoing and planned activities, products and services. The organization should consider normal and abnormal operating conditions including start-up and shut-down maintenance and emergency situations and accidents.

According to ISO 14001, the organization should not only consider those EA they can control, but also consider EA which it can influence.

Those elements can be consider when identify EA

1. Emissions of water, air, noise, solid waste and energy consuming



2. Raw material suppliers, engineering contractors, waste disposal company and Transportation Company which Greatview GmbH corporate with
3. Predictable element may lead to serious environmental influence (eg, leak, fire, and explosion)
4. Past and current environmental pollution

5. Evaluation method of Significant Environmental aspect

Significance is a relative concept and it may differ from one organization to another. Evaluating significance involves applying both technical analysis and judgment by the organization. The following method can be used when Greatview GmbH identify its SEA.

5.1 Judgment method

Any EA have the following features can be directly judge as SEA:

1. Consuming of electrical energy
2. Expect to have a serious environmental impact under abnormal or emergency situation
3. pollutant emissions exceed regulatory standards or legal requirements; emission of waste liquid
4. disposal of hazardous solid waste
5. potential chemical spills, fuel fire

5.2 Technology method

elements Points given	A	B	C	D	E
	occur frequency	scope of influence	degree of public concern	control status	hazard seriousness
5	Daily or continous	Influence beyond the company	Social extremely concerned	Poor control, must modify	Very large
4	Once a week	Affect the Company	Regional extremely concerned	Poor control Enhance controlsystem	large
3	Once a month	Affect the department	Regional general concern	Control is ok Enhance controlsystem	medium
2	Rare(once a few months)	Affect the class	May concern	Control is ok Control system exist	small
1	Hardly occur	Affect the position	no concern	Control well	Very small

6. Record

A form named 《Identification of Environmental Aspect》 is used for collecting Environmental Aspects as well as evaluating Signification Environmental Aspects from different departments. In “contents of Environmental Aspects” page, possible activities are indicated from “Table 1” to “Table 7”. There are examples of subtitles under every activity. In “form” page, an identification form is presented. In the meantime, an example of Environmental Aspect which is about office activities is given to explain how to fill this form. The last page is “Score Method”. Five elements are considered when evaluation Significant Environmental Aspect. Employees need to evaluate each element according to its degrees (from 1 to 5). When the sum of elements: $M=A+B+C+D+E \geq 15$, those EAs are recognized as SEAs.

Filled by : _____

Approved by : _____

[illegible]

APPENDIX 7. EA&SEA Identification form



Ref	Identify object(activity, products and service)	Environmental Aspects	Potential Environmental Impacts								Evaluation of Significance					SEA	Operational Control / O&T Reference				
			Use of energy	use of raw materials and natural resources	releases to water	releases to land	waste and byproduct	energy emitted	emissions to air	occur frequency	scope of influence	degree of public concern	control status	hazard seriousness	total score						
1	office	use of office supplies, electrical equipment, void deal	X			X				5	3	1	1	1	1	1	1	1	9	N	
2	employee commuting	use of vehicle	X							X	5	1	1	1	1	1	1	9	N		
3	staff meals	food waste				X				5	1	1	1	1	1	1	1	9	N		
4		fumes and wastewater discharge			X					X	5	1	1	1	1	1	1	9	N		
infrastructure maintenance																					

5	Office activities, production activities, transport of flammable and explosive gases, storage, electric welding, the aging of electrical equipment	potential fire, explosion																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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warehouse and logistics																	
13	Hazardous waste clean	volatile or hazardous waste gas, causing air pollution				X				X	disposal of hazardous waste			Y			
14	forklift & automatic guided vehicle use	for electric powered forklift,consumption of energy	X							X	5	3	1	2	3	14	N
15	Pull / delivery vehicles	interpowered vehicle energy	X							X	5	3	1	2	3	14	N
16	Accidental explosion	chemical library store gasoline and liquefied petroleum gas library store liquefied petroleum gas, if the accidental explosion occurred, causing air pollution							X	X	expect to have a serious environmental impacts under abnormal or emergency situation						Y
17	accidental fire	warehouse store too many flammable material, if fire occurred, will cause air pollution	X						X		expect to have a serious environmental impacts under abnormal or emergency situation						Y
18	Laser printer cartridges discarded	the residual toner cartridges			X	X					3	1	1	1	1	7	N
monitoring laboratory																	
19	laboratory analysis	disposal of the waste solution			X						disposal of hazardous waste						Y
20		disposal of the waste chemicals			X	X					disposal of hazardous waste						Y
21		disposal of waste experiment appliances	X		X	X					4	1	1	1	2	9	N
maintenance of production equipments																	
22	equipment maintenance procedure	use items and Waste generated in equipment repair and maintenance	X	X	X	X					disposal of hazardous waste						Y

23	equipment maintenance procedure	oxygen, acetylene, argon used in Machine repair	X	X						5	1	1	1	1	9	N		
24	equipment maintenance procedure	potential fire and leakage in Electrical repair and maintenance	X	X						expect to have a serious environmental impacts under abnormal or emergency situation						Y		
25	facility within workshop maintenance procedure	use items and Waste generated	X	X	X	X				X	5	1	1	1	2	10	N	
26	equipment operation procedure	Potential oil spills, explosions, Freon leak		X	X	X				X	expect to have a serious environmental impacts under						Y	
27	clean anilox	Use of anilox cleaning machine	X		X	X					5	1	1	1	1	9	N	
28	clean the printing plate	Use of plates cleaning agents		X		X					5	1	1	1	3	11	N	
29	laminator die head working procedure	filtrate the lamplack of die, there is drop of oil from cracks, the emissions of die lamplack from the			X	X				X	disposal of hazardous waste						Y	
30	Cleaning electrostatic filter Hoods	wasterliquid after cleaning		X	X	X					disposal of hazardous waste						Y	
31	clean laminator filter	use of equipment and produce waste				X	X	X	X	X	5	1	1	1	2	10	N	
Production																		
32		ink preparation	X	X	X	X					disposal of hazardous waste						Y	
33		platemaking			X					X	disposal of hazardous waste						Y	
34		plateninstall				X					5	1	1	1	2	10	N	



35	Production	print			X	X	X			disposal of hazardous waste						Y	
36		laminiate				X	X		X	disposal of hazardous waste						Y	
37		slitting					X			5	1	1	1	1	9	N	
38		"betacontrol" thickness gauge use						X		5	1	1	1	1	9	N	
39	Electrical Forklift	"betacontrol" disposal of thickness gauge waste radiation source						X		disposal of hazardous waste						Y	
40		charging battery, acid inside battery	X							5	4	1	1	1	12	N	
41	wastewater treatment	wastewater treatment			X	X	X			disposal of hazardous waste						Y	

APPENDIX 8. Solid waste control SOP



Solid waste control Procedure

Revision 0.0

1. Objective

Effective control of solid waste which generated by company's production and activities. Manage the solid waste from whole company in order to maximize recycling, effectively manage and reduce environmental pollution

2. Scope

Applied to the collection, storage and process of waste within the company

3. Responsibility

- Planning department is responsible for overall management of solid waste within the company
- Every department is responsible for the classification of its solid waste. Deliver to designated places and do written handover with planning department.
- Environmental engineer is responsible for collection, storage and management of hazardous solid waste
- Order center factory transportation department is responsible for contacting and signing a contract with a qualified company to do solid waste disposal.

4. Procedure

4.1 Waste classification

The waste materials which the company outputs in production and living activities. They are:

4.1.1 A: Recyclable waste (Mainly: waste paper, waste paper composite, PE side, polyethylene waste, scrap aluminum, packaging materials, paper core, wooden pallets, wooden boxes, scrap steel tube, ink barrels, discarded equipment, PE block, equipment boxes discarded equipment, spare parts, office waste paper, etc.)

4.1.2 B: Non-recyclable waste (household waste)

4.1.3 C: Hazardous solid waste (Mainly: the sludge generated during wastewater treatment, waste plates, waste oil, containers of hazardous chemicals or direct packaging, waste batteries, batteries, lamps, disk, etc.)

4.2 disposal of recyclable waste

- 4.2.1 Every department is responsible for classify its department's waste and do written transfer with planning department, store the waste in a specified location according to the planning department's request. Factory order center department of transportation do tendering treatment for all waste
- 4.2.2 Waste custodian and the using unit should collect the overwrap of chemical, the overwrap of equipment and stored centrally. To manufacturers is responsible for recycling, should be well preserved and send to manufacturers for recycling. To manufacturers is not responsible for recycling, waste custodian is responsible for classification and send to designated place to store, Factory order center department of transportation do tendering treatment



4.3 disposal of non-recyclable waste

Small amount of household garbage which is outputted by company's production or live activity, should be stored in designated locations, eventually commissioned for these waste professional company to handle. (HR department is responsible for it)

4.4 disposal of hazardous solid waste

- 4.4.1 Waste plated, waste oil, and other toxic and hazardous waste which generated in production activities, waste disk, waste batteries, waste lamps and other toxic wastes generated in office activities are all collected by environmental engineer, store centrally in a specified location, transportation department is responsible for contacting organization which has corresponding hazardous waste treatment qualification, sign contract and deal with the waste, the duplicate forms for transfer of hazardous waste should be remained.
- 4.4.2 The sludge which generated during ink wastewater treatment should be stored in "sludge point" area, and be legal processed by qualified department regularly. The duplicate forms for transfer of hazardous waste should be remained.
- 4.4.3 Toner cartridge/ ink cartridge are received by "trade-in", IT administrators is responsible for giving waste Toner cartridge/ ink cartridge to supplier for recycling.
- 4.5 the specific method is applied to relevant parties according to 《control procedure for environmental behaviors of relevant parties》
5. Related/ supporting documents

《Control procedure for environmental behaviors of relevant parties》

《Sludge pollution prevention responsibility system》

《Sludge storage management procedures》

《Hazardous waste management regulations》

《Solid waste contingency plan》

《Sludge transfer programs》

6. Record

《Hazardous Waste List 》

《Workshop waste storage point distribution map》

《Factory internal waste clean-up map》

7. Other

None

8. Flowcharts and accessories

None